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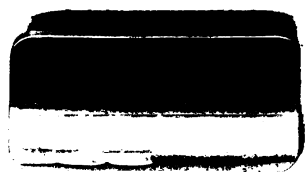
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Exhibit by State Horticultural Society at State Fair Milwaukee, September, 1914. Exhibit occupied 1536 sq. ft. floor space; three hundred and fifty bushels choice apples.

ANNUAL REPORT

OF THE

**Wisconsin State Horticultural
Society**

For the Year 1915

VOL. XLV

F. CRANEFIELD, Editor
MADISON, WIS.

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LETTER OF TRANSMITTAL

MADISON, WIS., APRIL 1, 1915.

To His Excellency, EMANUEL L. PHILIPP,

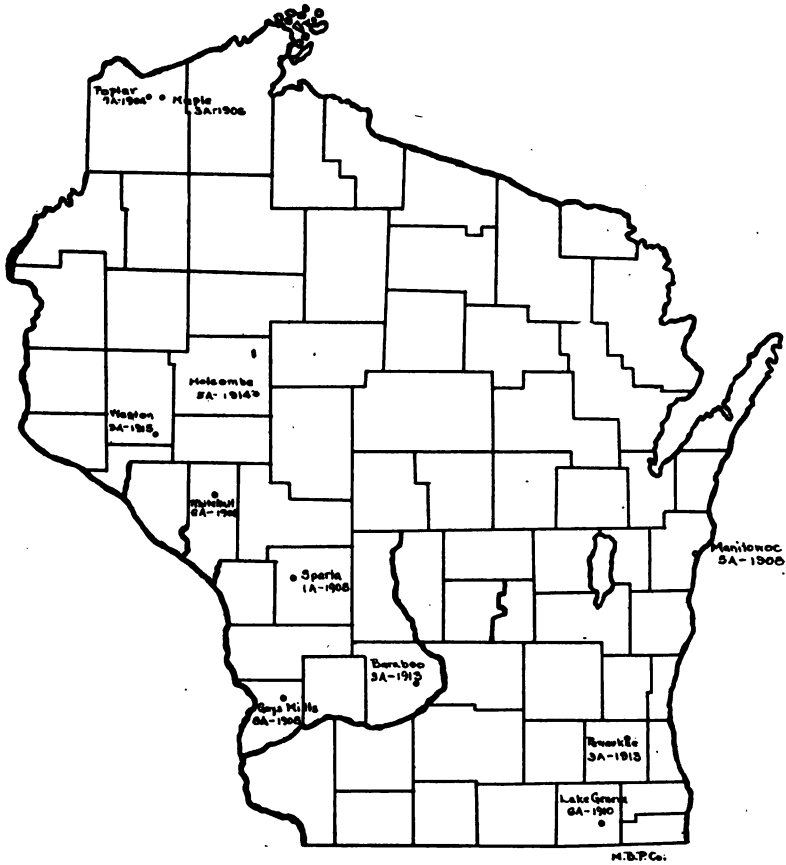
Governor of Wisconsin.

DEAR SIR:—I have the honor to transmit to you herewith the Forty-fifth Annual Report of the Wisconsin State Horticultural Society.

Respectfully,

FREDERIC CRANFIELD,

Secretary.



The State Horticultural Society has established and maintains eleven Trial Orchards for the purpose of testing the adaptability of varieties of tree fruits to the widely varying soil and climatic conditions of the state. The location, date of founding and acreage of each orchard or station is shown above.

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OFFICERS AND COMMITTEES, 1915

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LIST OF FRUITS RECOMMENDED FOR CULTURE IN WISCONSIN

The behavior of varieties of fruits is influenced very largely by environment. The conditions of soil, exposure and latitude over such an extensive area as the state of Wisconsin vary greatly and no list can be given that will prove satisfactory in all localities. The following provisional lists were prepared by the Trial Orchard committee. Hardiness of plant and fruit bud has been the leading thought in the selection of varieties.

APPLES (General List).

Alexander, Astrachan (Red), Autumn Strawberry, Dudley, Fall Orange, Fameuse (Snow), Golden Russett, Lowland Raspberry, Longfield, Lubsk Queen, McIntosh, Malinda, McMahan, Newell, Northwestern Greening, Oldenburg (Duchess), Patten Greening, Perry Russett, Plumb Cider, Scott, Tetofski, Talman (Sweet), Utter, Wealthy, Westfield (Seek-no-Further), Windsor, Wolf River, Yellow Transparent.

APPLES (Lake Shore List).

In addition to the above many other varieties including the following may be successfully grown in the southern part of the state and in the counties bordering on Lake Michigan: **Baldwin, Eureka, Fallwater, Gano, King, Northern Spy, Pewaukee, Willow Twig, York Imperial, Bellflower**

APPLES (Commercial Orchard List).

It is generally conceded that a commercial orchard should consist of but few varieties; the following are suggested: **Dudley, Fameuse, McMahan, McIntosh, Northwestern Greening, Oldenburg, Scott, Utter, Wealthy, Yellow Transparent.**

APPLES (Five Varieties for Farm Orchard).

Northwestern Greening Oldenburg (Duchess), Talman (Sweet), Wealthy, Astrachan.

CRABS.

Brier Sweet, Hyslop, Lyman, Martha, Sweet Russett, Transcendent, Whitney.

PLUMS.

Of the classes commonly cultivated, viz.: **European, Japanese** and **Native or American**, the last named is the most reliable.

NATIVE PLUMS.

De Soto, Forest Garden, Hammer, Hawkeye, Ocheeda, Quaker, Rockford, Surprise, Wyant, Wolf.

EUROPEAN PLUMS.

(Not recommended except along Lake Shore). **Lombard, Green Gage, Moore's Arctic.**

JAPAN PLUMS.

(Not recommended except along Lake Shore). **Abundance, Burbank.**

CHERRIES.

Early Richmond, Montmorency.

GRAPES.

Brighton, Campbell's Early, Concord, Delaware, Diamond, Green Mountain, Moore's Early, Niagara, Worden.

BLACKBERRIES.

Briton (Ancient), Eldorado, Snyder.

STRAWBERRIES.

Varieties starred have imperfect flowers and must not be planted alone.
Aroma, Bederwood, *Crescent, Clyde, Dunlap, Enhance, Gandy, Glen Mary, *Haverland, Lovett, *Sample, Splendid, *Warfield.

TWO VARIETIES STRAWBERRIES FOR FARM GARDEN.

Dunlap, *Warfield.

RASPBERRIES.

Black: **Conrath, Cumberland, Gregg, Older, Plum Farmer.**
Red: **Cuthbert, Loudon, Marlboro.**
Purple: **Columbian.**

CURRANTS.

Red: **Red Cross, Red Dutch, Long Branch Holland, Victoria, Perfection.**

White: **White Grape.**

Black: **Lee's Prolific, Naples.**

GOOSEBERRIES.

Downing.

PEARS.

On account of the prevalence of blight and winter killing pears are not generally recommended for Wisconsin. Good crops are occasionally produced under favorable conditions, especially in the south-eastern part of the state. The following list includes both early and late varieties.

Anjou, Bartlett, Claireau, Clapp Favorite, Early Bergamot, Flemish Beauty, Idaho, Kieffer, Laurence, Louise, Seckel, Sheldon, Vermont Beauty.

TREES AND SHRUBS RECOMMENDED

EVERGREENS.

For screens and windbreaks—Norway Spruce, White Spruce, White Pine, Austrian Pine, Scotch Pine.

For hedges and screens for shearing—Norway Spruce, American Arbor Vitae, Red Cedar.

For lawns—Norway Spruce for backgrounds. For groups—American Arbor Vitae, Red Cedar, White Spruce, Colorado Blue Spruce, Austrian Pine, Scotch Pine.

For small lawns—Arbor Vitae, Savin Juniper, Mugho Pine.

DECIDUOUS TREES.

The more desirable ones are starred, and a further selection of five is indicated by double stars.

**American Elm, Box Elder, Black Cherry, Carolina Poplar, **Green Ash, *Hackberry, Honey Locust, Larch, **Linden, **Norway Maple, *Scarlet Maple, **Silver Maple, *Sugar Maple, Scarlet Oak, *White Oak, White Ash.

DECIDUOUS ORNAMENTAL TREES.

This class includes smaller deciduous trees of more value for ornament than for shade or defense.

Crab (native), also Bechtel's double flowering crab, Cut-leaved Weeping Birch, Tartarian Maple, Ginnala Maple, Kentucky Coffee Tree, Mountain Ash, Weeping Willow, Russian Mulberry.

LIST OF SHRUBS RECOMMENDED.*

Common Name.	Scientific Name.
Thunberg's Barberry	Berberis Thunbergii
Common Barberry	Berberis vulgaris
Purple-leaved Barberry	Berberis vulgaris var. atropurpurea
Purple Filbert	Corylus maxima var. purpurea
Weigela (rose)	Diervilla florida

*From bulletin 108, Wisconsin Experiment Station, by F. Cranefield.

Weigela (white)	Diervilla candida
Weigela (Eva Rathke)	Diervilla hybrida
Desbois Weigela	Diervilla hybrida var. Desboisii
Silver Berry	Eleagnus argenta
Strawberry Tree	Euonymus Europaeus
Althea	Hibiscus Syriacus
Sea Buckthorn	Hippophae rhamnoides
Garden Hydrangea	Hydrangea paniculata gr.
Ruprecht's Honeysuckle	Lonicera Ruprechtiana
Tartarian Honeysuckle	Lonicera Tartarica
Tea's Weeping Mulberry	Morus Alba var.
Mock Orange	Philadelphus coronarius
Golden Mock Orange	Philadelphus coronarius var. aurea
Mock Orange large	Philadelphus inodorus
Shrubby Cinque Foil	Potentilla fruticosa
Russian Almond	Prunus Nana
Rhodotypos	Rhodotypos kerrioides
Smoke Bush	Rhus Cotinus
Missouri Flowering Currant	Ribes aureum
Rose Acacia	Robinia hispida
Japanese Rose	Rosa rugosa
Golden Elder	Sambucus nigra var. aurea
Buffalo Berry	Shepherdia argentea
Bumalda Spiraea	Spiraea Bumalda
Anthony Waterer Spiraea	Spiraea Bumalda var.
Billard's Spiraea	Spiraea Billardii
Douglas' Spiraea	Spiraea Douglassii
Japanese Spiraea	Spiraea Japonica
Meadow Sweet Spiraea	Spiraea salicifolia
Van Houten's Spiraea	Spiraea Van Houtte
Persian Lilac	Syringa Persica
Chinese Lilac	Syringa villosa
Common Lilac	Syringa vulgaris
Amur. Tamarix. Tamarix Pallasii Desv. (Tamarix Amurense Hort.)	
Snowball	Viburnum Opulus vr. sterile

ROSES.

Hardy garden—Harrison Yellow, Persian Yellow, Madame Plantier. Twelve varieties hybrid perpetual—Paul Neyron, Mrs. J. H. Laing, Gen. Jacqueminot, Dinsmore, Marshall P. Wilder, Coquettes des Blanches, Earl of Dufferin, Jules de Margottin, Vick's Caprice, Magna Charta, Prince Camille de Rohan, General Washington.

Moss roses—Perpetual White, Salet, Paul Fontine, Henry Martin.

Climbers—Prairie Queen, Russell's Cottage, Seven Sisters, Gem of the Prairies, Crimson Rambler, Dorothy Perkins.

Five hybrid perpetual roses for the garden: General Jacqueminot, Magna Charta, Frau Karl Druschki, C. F. Meyer, Paul Neyron.

COMPARATIVE HEIGHT AT MATURITY OF DIFFERENT SHRUBS.

The height at maturity of the different species must be considered when planting in groups or borders. This will depend so much upon their environment that it is difficult to give the height in feet that any species may be expected to attain. When different kinds are planted under like conditions it may be assumed that relative heights will be maintained. The following may serve as a partial guide in planting:

Tall—10 to 15 Feet.

Barberry (Common)	Mock Orange
Lilac, Common	Honeysuckle, Slender
Lilac, Japanese	Sea Buckthorn
Golden Elder	Honeysuckle, Tartarian
Lilac, Jossika's	Siberian pea tree (tall)
Honeysuckle, Fly	Honeysuckle, Tartarian white

Medium—6 to 10 Feet.

Barberry, purple	Spiraea Douglas
Crandall Currant	Purple Filbert
Silver Berry	Spiraea Three-lobed
Honeysuckle, Blue	Rose Acacia
Strawberry Tree	Spiraea, Van Houten's
Japanese Rose	Russian Almond
Spiraea, Billard's	Weeping Mulberry
Lilac, Chinese	Siberian Pea tree (dwarf)
Lilac, Persian	Wiegela

Dwarf—2 to 6 Feet.

Althea	Honeysuckle, Albert's
Spiraea, Anthony Waterer	Spiraea, Japanese
Barberry, Thunberg's	Hydrangea
Spiraea, Ash-leaved (Sorbaria)	Spiraea, Meadow Sweet
Cinque Foil	Rhodotypos
Spiraea, Bumalda	Spiraea Plum-leaved

A LIST OF NATIVE SHRUBS DESIRABLE FOR PLANTING ON HOME GROUNDS.

Common Name.	Scientific Name.
Bearberry	<i>Arctostaphylos Uva-ursi</i>
New Jersey Tea	<i>Ceanothus Americanus</i>
Button Bush	<i>Cephalanthus occidentalis</i>
Prince's Pine	<i>Cimaphila umbellata</i>
Round-leaved Dogwood	<i>Comptonia aspleniflora</i>
Red Osier Dogwood	<i>Cornus stolonifera</i>
Leatherwood (Wickopy)	<i>Dirca palustris</i>
Trailing Arbutus	<i>Epigaea repens</i>
Wahoo	<i>Euonymus atropurpureus</i>
St. John's Wort	<i>Hypericum pyramidatum</i>
Winterberry (Holly)	<i>Ilex verticillata</i>
Trailing Juniper	<i>Juniperus procumbens</i>
Sweet Gale	<i>Myrica Gale</i>
Ninebark	<i>Physocarpus opulifolia</i>
Buckthorn	<i>Rhamnus catharticus</i>
Staghorn Sumac	<i>Rhus Typhina</i>
Smooth Sumac	<i>Rhus Glabra</i>
Dwarf Sumac	<i>Rhus copalina</i>
Wild Red Currant	<i>Ribes Rubrum</i>
Wild Black Currant	<i>Ribes floridum</i>
Wild Rose (tall)	<i>Rosa lucida</i>
Wild Rose (dwarf)	<i>Rosa blanda</i>
Purple-flowered Raspberry	<i>Rubus odoratus</i>
White-Flowered Raspberry	<i>Rubus Nutkanus</i>
Common Elder	<i>Sambucus Canadensis</i>
Scarlet Elder	<i>Sambucus pubens</i>
Snowberry	<i>Symphoricarpus racemosus</i>
Coral Berry	<i>Symphoricarpus vulgaris</i>
Ground Hemlock	<i>Taxus baccata</i>
Sheepberry	<i>Viburnum lentago</i>
Black Haw	<i>Viburnum dentatum</i>
.....	<i>Viburnum acerifolium</i>
Bush Cranberry	<i>Viburnum opulus</i>
Prickly Ash	<i>Zantoxylum Americanum</i>

SIX SHRUBS FOR HOME GROUNDS.

The following are all reliably hardy in any part of the State:
 Common Lilac, Tartarian Honeysuckle, *Rosa Rugosa*, Mock
 Orange or *Syringa*, Van Houten's *Spiraea*, Common Barberry.

THREE HARDY PERENNIAL VINES.

Ampelopsis or American Ivy, Wild Grape, Trumpet Honeysuckle.

SIX HARDY HERBACEOUS PERENNIALS.

Phlox, Peony, Larkspur, Bleeding Heart, Lily of the Valley, Day Lily.

SPRING FLOWERING BULBS.

Tulips, Single dwarf; Duc van Tholl pink, scarlet, white.

Tulip medium; red Artus, yellow Chrysolora, pink Cottage Maid.

Hyacinth single; pink Charles Dickens, white Baroness von Thuyll, blue Baron von Thuyll.

Narcissus (daffodil), Von Sion.

Crocus; Mixed.

Tulips and other Holland bulbs must be planted in September or October and bloom early in spring.

BLACK LIST

A LIST OF SHRUBS ALL OF WHICH HAVE BEEN TESTED ON
THE GROUNDS OF THE EXPERIMENT STATION AT
MADISON AND FOUND UNSATISFACTORY.

Common Name.	Scientific Name.
Rhododendron	Azalea arborescens
Rhododendron	Azalea viscosa
Azalea	Azalea nudiflora
Azalea	Azalea mollis
Sweet-scented shrub	Calycanthus floridus
Blue Spiraea	Caryopteris Mastacanthus
White Fringe	Chionanthus Virginica
Sweet Pepperbush	Clethra alnifolia
Bladder Senna	Colutea arborescens
Flowering Dogwood	Cornus florida
Japanese Quince	Cydonia Japonica
Daphne	Daphne Cneorum
Daphne	Daphne Mezereum
Slender Deutzia	Deutzia gracilis
Goumi	Eleagnus longipes
Pearl Bush	Exochorda grandiflora
Golden Bell	Forsythia suspensa
Snowdrop tree	Halesia tetraptera
Virginia Willow	Itea Virginica
Kerria	Kerria Japonica
Common privet	Ligustrum vulgare
Paulownia	Paulownia imperialis
Purple Leaved Plum	Prunus cerasifera var. (Prunus pissardi Hort.)
Flowering Almond	Prunus Japonica
Flowering Plum (double)	Prunus triloba
Arguta Spiraea	Spiraea Arguta
Thunberg's Spiraea	Spiraea Thunbergii

The plants of certain of the above named varieties made a good growth each year but did not blossom unless given thorough winter protection. In this class are Bladder Senna, Flowering Almond, Flowering Plum and Golden Bell.

The Japanese Quince is hardy of bush but did not bear flowers except when given winter protection. The Goumi will only bear fruit when protected in winter. The double-flowered Almond

will blossom freely if given thorough winter protection, otherwise it will kill back severely. The double-flowered plum grows well and after a mild winter will bear flowers in advance of the leaves; unreliable, however, four years out of five if unprotected.

The others of this list either died outright or else barely survived.

POISONS USED TO DESTROY INSECTS IN ORCHARDS AND GARDENS

PARIS GREEN.

A well known poison used to destroy biting insects, as the apple worm, tent caterpillar, potato beetle, etc.

Formula

Paris Green	1 to 2 lbs.
Fresh (unslacked) lime	1 lb.
Water	100 gals.

One-half pound of pure Paris Green to 50 gallons of water is sufficient to destroy codling moth and other insects in the orchard and fruit plantation if properly applied.

Add $\frac{1}{2}$ lb. of Paris Green to every barrel of Bordeaux mixture and make a complete spray.

ARSENATE OF LEAD.

(A Poison for Biting Insects.)

This poison is better than Paris Green for the following reasons:

- (1) It remains longer in suspension.
- (2) It adheres better to the foliage; one thorough application being sufficient for the entire season.
- (3) It may be used in any reasonable quantity without danger of injury to the foliage.

Use at the rate of 2 to 3 lbs. to 50 gals. of water or Bordeaux.

Add $2\frac{1}{2}$ lbs. of Arsenate of Lead to every barrel of Bordeaux mixture and make a complete spray.

WHITE HELLEBORE.

(For Biting Insects.)

Used to destroy currant and cabbage worms and on fruits and vegetables where more poisonous substances cannot be used with safety.

Formula

Powdered white hellebore-----1 oz.
 Water -----2 to 3 gals.

It may also be used in the powder form mixed with flour, gypsum, soot, etc.

BORDEAUX MIXTURE.

The Universal Fungicide. Not a cure but a preventive of fungous diseases.

Formula

Copper sulphate -----4 lbs.
 Fresh (unslacked) lime -----5 lbs.
 Water -----50 gals.

Dissolve the copper sulphate in 25 gals. of water in one barrel or cask.

Slake the lime so as to make a paste which dilute to 25 gals. in another barrel.

The lime water should be strained to remove coarse particles which clog the nozzles in spraying.

Pour these two solutions together into a third barrel and the resultant mixture is Bordeaux.

Add 2 to 3 lbs. of Arsenate of Lead to every barrel and make a complete spray.

Caution: Use only wood, copper, earthenware or glass vessels in making Bordeaux.

Stock Solution for Bordeaux.

The above formula and directions may be followed when only small quantities are used. When ten barrels or more are used at one application always employ stock solutions.

For example. Dissolve 100 lbs. sulphate in 50 gals. water.

Slake 100 lbs. lime and dilute to 50 gals.

Then use the following formula:

Water ----- (approximately) 45 gals.
 Sulphate Solution -----2 gals.
 Lime Solution -----2½ gals.

LIME SULPHUR COMPOUND.

Used to destroy San Jose Scale, Oyster Shell Bark Louse and other insects.

Commercial Lime Sulphur.

Lime sulphur in commercial form is generally more desirable than the homemade product particularly that made in Wisconsin since our lime does not generally contain a high percentage of calcium. In fact commercial lime sulphur can be purchased for

very little more than the cost of the ingredients which are used in the homemade wash.—Prof. J. G. Sanders.

Formula for dormant spray.

Commercial lime sulphur	1 part
Water	6 parts

Lime sulphur compound, diluted as above is for dormant spray only. After growth has begun, use at rate of 1 part lime sulphur to 35 of water.

SPRAY:

WHAT?	WHY?	HOW?	WHEN?			REMARKS
			1ST SPRAYING	2D SPRAYING	3D SPRAYING	
Apple	Scab	Bordeaux Mixture	Just before Blossoms Open	Just after Blossoms Drop	10 days after 2d Spraying.	
	Codling Moth	Arsenate of Lead combined with Bordeaux	Just after Blossoms Drop	10 days later.	Last week of July or 1st week of August for 2d brood	1st and 2d Spraying same as 2d and 3d for scab; merely add arsenate of lead to Bordeaux
Cherry and Plum	Oyster Shell Scale	Lime Sulphur 1 part L. S. to 6 of Water.	March or early April but before growth starts			Do not use Lime sulphur 1 to 6, on growing plants
	Mildew and Shot-hole fungus	Bordeaux Mixture 3—4—50	When leaves are about $\frac{1}{2}$ grown	10 to 12 days later	10 to 12 days later	
Currant and Gooseberry	Mildew, blight and Currant worm	Bordeaux and Arsenate of Lead	When leaves are fully developed	2 to 3 weeks later		
	Mildew and Anthracnose	Bordeaux	Before leaf buds open	2 to 3 weeks later	3rd, 4th and 5th applications at intervals of 2 weeks if required	
Strawberry	Leaf-spot or blight and leaf eating insects	Bordeaux and Arsenate of Lead	When first leaves appear	After blossoms fall		
Raspberry and Blackberry	Anthracnose and fungous diseases	Bordeaux	As above	2 weeks later		Spray new growth after fruit harvest

AN OUTLINE OF THE WORK OF THE WISCONSIN STATE HORTICULTURAL SOCIETY

The Wisconsin State Horticultural Society conducts field work at eleven different points in the state as follows:

Poplar, Maple, Whitehall, Manitowoc, Sparta, Baraboo, Holcombe, Pewaukee, Gays Mills, Lake Geneva and Weston.

The work was begun in 1897 at Wausau for the purpose of testing the hardiness and adaptability of the different varieties of tree fruits in the northern or "cut-over" regions of the state.

These orchards comprise 59 acres and 5,945 trees in addition to two acres of grapes.

The orchards at Poplar, Maple and Holcombe, are "Trial" Orchards, being for the purpose above indicated; the Sparta vineyard is also in this class.

The remaining orchards are located in sections where tree fruits are known to thrive and are designed as "Model" or demonstration orchards to show the best methods of culture, best varieties for market, etc.

An account is opened with each of the "Model" orchards with the confident expectation that a decided margin or profit will be shown at the end of 10 or 12 years. The orchards should then yield profitable crops for 20 years longer with but moderate expense for maintenance.

In these two ways the society hopes to demonstrate the possibilities of fruit growing in Wisconsin.

ADDITIONAL AIMS AND PURPOSES OF THE WISCONSIN STATE HORTICULTURAL SOCIETY.

Organized in 1865, being the legitimate successor of the Western Fruit Growers' Association, which was organized in 1853.

Chartered by the state of Wisconsin in 1871.

Purely an educational institution.

Its purpose the advancement of every branch of horticulture throughout the state.

Aims to accomplish this through publications, individual help and Conventions (two yearly).

Issues an annual report containing articles by experts on orchard culture, small fruit and vegetable gardening and the decoration of home grounds. Sent free to members.

Issues a monthly magazine, Wisconsin Horticulture, which is sent free to members.

WE ANSWER QUESTIONS.

Individual help is furnished through the Secretary who obtains from reliable sources information on any horticultural topic. No charges for such services.

Receives an annual appropriation from the state for the support of the field work and other activities.

Extends an urgent invitation, a promise of help and the hand of fellowship to all who want to learn about the growing of fruit, flowers or vegetables; to all who love the beautiful in nature a hearty welcome is assured.

Cordially invites every person in Wisconsin who wants to know something about fruit, flowers or vegetables, to become a member as such persons are needed to help along the splendid work in which the Society is engaged.

FREDERIC CRANEFIELD,

Secretary W. S. H. S.,

Madison.

WISCONSIN HORTICULTURE

A **WISCONSIN MAGAZINE** published by the **WISCONSIN STATE HORTICULTURAL SOCIETY** containing each month articles on fruit, flower and vegetable growing written by **WISCONSIN** growers for **WISCONSIN** conditions.

In this respect it is in a class by itself. Horticultural papers published for profit must cover the whole country, or aim to do so, and sometimes the information gets pretty thin from being spread so far.

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FREDERIC CRANEFIELD,
Secretary W. S. H. S.,
Madison.

TRANSACTIONS
of the
Wisconsin State Horticultural Society

ANNUAL CONVENTION
Madison, December, 15, 16 and 17, 1914

TUESDAY AFTERNOON, DECEMBER 15th

The meeting opened with President Palmer in the chair. After music by the Bayfield quartette, C. A. Hoffman, of Baraboo, read a paper on,

BULBS AND THEIR CULTURE

The subject assigned me at this meeting is so broad and extended that to do justice to it in its entirety would consume much more time than I fear is allotted me. I will therefore take but a subdivision of the subject viz;—"INDOOR CULTURE OR FORCING OF BULBS." The bringing to bloom of bulbs out of their season is one of the most fascinating of the many phases of Floriculture, requiring, for complete success, a thorough knowledge of kinds, habits, soils, conditions, and temperature. This should by no means deter the amateur from active participation in the field for all reputable dealers, especially those who have served a proper apprenticeship, do not hesitate to give to their patrons the results of their experiences to guide them in their endeavors. More failures can be charged against a neglect of these instructions than to any other cause. I have previously mentioned the essentials necessary to success therefore let us consider the subject in rotation, first of kind:—Remember that all bulbs of the Holland or Cape families do not force satisfactorily. In making your selections, be they Hyacinths, tulips, daffodils, Narcissus or Lilliums, unless you have had previous experience, select the colors you desire and allow your dealer to select the varieties best adapted to pot culture. If he is honest, capable and sincere, his experience and judgment will be the

guide to your success. Many of the most reliable dealers catalogue their bulbs which force well as Forcing Bulbs, thus aiding the amateur in selection. Habits of growth are best learned by actual experience and are seldom correctly portrayed in catalogues. I have compiled a leaflet on this subject, from actual experience, which I will be pleased to furnish free to anyone interested. Insect pests and disease are practically absent in indoor bulb culture. It occasionally happens that rot or blight appears but in most cases this is due to improper drainage, ventilation, or a desire to bring into bloom before sufficient root growth has been established, than to any defect in the bulb. If new pots are used it is my advice that they be soaked in water for ten or fifteen hours before using so that they will not immediately absorb the moisture intended for the growth of the bulb.

If, however, old pots are used in addition to the foregoing, give them a thorough washing with brush or rag removing all the sediment and grease, thus allowing the air to get through the pot pores to the rootlets.

HARDY BULBS FOR THE HOUSE.

Deliberately I say it: Hardy bulbs are worth more for window culture than any other class of flowering plants whatever. In the ordinary flower-growers' hands and in ordinary windows a dollar's worth of them will give more bloom than five dollars' worth of greenhouse plants. They will even stand a few degrees of frost, and they will freely blossom where there is little sunlight. Moreover insects almost never attack them.

Follow these three rules and the easy class of Holland bulbs cannot fail with pot culture: (1) Set away in the dark until the pot is full of roots. (2) do not water during this time unless the soil has become really dry, and (3) bring gradually to the light.

POTTING BULBS.

Some say to sift the soil for the bulbs and to make it a fourth manure. Do not do either. The bulbs start growth much slower in the sifted soil and unless the manure is very old it causes more or less of the bulbs to rot in the cellar. What is wanted is a light, loose, rich soil, and if somewhat sandy it is all the better. Soil from a garden that was well fertilized in the spring and worked all summer is excellent. So is rotted sod. If a fourth or fifth part clean white sand can be added one will have an ideal bulb soil.

Put a layer of charcoal or pebbles at the bottom of the pot, fill two-thirds full of soil, then put in the bulbs and fill in around them, leaving the crown of each bulb so it can barely be seen. In potting Narcissus leave the earth beneath them loose and fine. If this is not done they will have a tendency to get upon stilts as they grow. The roots instead of working downward push

the bulb straight up in the air. If left this way the bulb is injured and the blossom perhaps blasted. The remedy is to repot at once.

SIZE OF POTS.

Alliums, Ixias, Sparaxis, Babianas, Scillas, Freesias and all small bulbs should have several bulbs to a pot. A 3-inch pot will hold a couple of Alliums, and a 4-inch pot four Freesias. A 4-inch pot is the proper size for a couple of Roman Hyacinths, a 5-inch pot for a couple of Narcissus or show Hyacinths or a 6-inch pot for three bulbs. Pompon Hyacinths require about the same room as Roman Hyacinths and jonquils will stand a third more crowding. Tulips, grape Hyacinths, crocus and snowdrops need thick planting.

Water the bulbs well and set away at once in a cool, dark cellar or closet and let them stay there until rooted. In a damp cellar they often need no more watering until they are ready to bring up. In some cellars they need watering a couple of times and in some twice that often. No water should be given as long as the soil is moist.

KEEP BULBS IN THE DARK.

It is the nature of hardy spring bulbs to make their roots before sending up top growth. In the ground the outer atmosphere is cold and the leaf and flower shoots feel no impulse toward growth, but the roots grow steadily on. We imitate these conditions by putting our potted bulbs in a dark cool place to root.

They must have their full amount of roots to produce first-class flowers, and they must have darkness to make these roots. Why? Because our plant rooms are both warm and light, and warmth with light immediately excites leaf and flower development. They will start at once to grow but soon fail because there are not enough feeding roots to support them. The result is a stunted, sickly growth. In the cellar of moderate temperature bulbs usually need to stay six or seven weeks. In a cool cellar they need a couple of weeks longer. It does not injure bulbs to stay over this time. It does injure to remove them before they are fully rooted.

When the pots are filled with roots, shoots begin to push up from the crown of the bulb. Some make it a rule to bring the pots to the light whenever these center shoots are half an inch high.

BRINGING TO THE LIGHT.

Do not make the mistake so many do of bringing the pots of bulbs into a sunny window the first thing. This applies particularly to the show or large flowered Hyacinths. The Hyacinth is the queen of winter flowers, but those who carry it at once into

bright light find it a failure. The nucleus of the flower is already folded tight in the heart of the bulb. The throat of the bulb, through which it must pass, is narrow and the flower spike must creep through this straightened gateway while still tightly folded together or they will get wedged there and not be able to get any farther. Light has an exciting effect upon these rudimentary flowers, they will begin at once to swell out and of course they get stuck in the neck of the bulb.

Bring all bulbs, and more especially large flowered Hyacinths, first to the subdued light. Keep them there until a flower head can be discerned. As soon as the stem beneath it can be seen the bulbs may be brought at once to the light. They are not particular as to the amount, blooming well with full sunshine or in good light without direct sunshine at all. Narcissus, however, needs sunshine.

If a mistake has been made and the bulbs show choked flowers in consequence, cones of paper, made with a small hole at the top, may be dropped over each bulb. If not too lightly wedged they will be drawn upwards to the light and so get through. If firmly wedged a careful cutting through one side of the neck helps matters.

AFTER BLOOMING.

After the bulbs are through blooming remove them to a back shelf and let them complete their growth. When spring comes plant these bulbs in the border. They do not force well two years in succession. Out-of-doors they recover their vigor and bloom in the border the next spring. In many localities bulbs increase rapidly and form sound large bulbs. It is necessary in such cases to thin them out and replant every third year, and the largest of these home raised bulbs will bloom well in the house.

THE EASIEST GROWN BULBS.

The easiest of all bulbs to force are these: White Roman Hyacinths, double Roman Narcissus and Chinese sacred lily. They are all of real merit. No flower grower can afford to be without them. Hyacinths, paper white Narcissus and sacred lily may be grown in water or earth. Planted in water they will be in bloom by Thanksgiving or if planted in earth they will be in bloom at the holidays, which is about the time the other two, the Roman Hyacinth and the Roman Narcissus bloom. These "easy four" keep well unplanted. And as they are such quick bloomers, if planted in succession from the middle of September to the middle of January will give a succession of flowers from December to April.

There are several others almost as easy growers. The other Hyacinths are splendid when in bloom. Named Hyacinths are the grandest of all winter flowers, blooming from January on.

Their spikes are wreathed from top to bottom with wax-like flowers of superb beauty and of the most lovely colors. The single ones are the handsomer.

Narcissus nearly all belong to the easy class. Everyone ought to try several of these and of different classes as they are so unlike as to seem like entirely different flowers. Among the extra easy ones are Princess, Victoria, Emperor and all of the jonquils, in shades of canary, gold and yellow, Stella and Cynosure, broad, star-like flowers, and Horsfeldi and Empress with the grandest of flowers, the trumpet one color and the perianth another. Uncommonly elegant flowers are found in the Polyanthus or cluster flowered class and the double Phoenix and Van Sion with their great blossoms. These need good light to perfect their flowers but otherwise are as easy as the others to grow.

BULBS IN WATER.

Chinese sacred lilies, Hyacinths, paper white and various Polyanthus Narcissus may be grown in water. Steady the bulbs by a few pebbles at their base and fill up the bowl with water. Give fresh water every few days. They can be started in the light but are uniformly better if placed in a dark closet or cupboard at least a week for the roots to start ahead of the tops. After the bulbs have bloomed in the water they are so exhausted that most people throw them away.

BULBS OF A MORE DIFFICULT NATURE.

Crocus, scillas, snowdrops and tulips will not do well if grown in a warm room. And yet these flowers are easily grown and always admired when in bloom. All of them need close planting, the tulips two inches apart and the others with but an inch space between them. Put them to root in a perfectly dark and cool cellar, or better yet, bury them out of doors, covering with earth, and over that a layer of leaves and boards over all. In the ground they will root better than they will in a cellar. Leave them here until after New Years then lift them. In most climates when the board shelter and leaf covering is removed the ground over them will not be frozen so hard but what they can be taken up. Bring them into a cool room, such as a frostless but unheated hall or bedroom or an apartment heated by a stove in another room. Here they will grow slowly and in February or March will bloom. Tulips are so brilliant that it pays to take a little pains to secure them. If kept cool any of them may be flowered in the house, although the Duc Van Thol and early single class are the best adapted to pots. The Crocus and Scillas do not need to be buried in the ground but need to take their time and to be kept cool.

Grape Hyacinths need about the same treatment as Hyacinths but are usually somewhat slower rooting. Leave them in the dark

until this is done and keep at a moderate, never a hot, temperature after bringing to the light.

Candidum lilies are stately plants, fairly easy to grow. They must have plenty of time and for amateurs bloom better if kept but moderately warm. Like tulips, they can be rooted in a cellar but do a better job of it if sunk in the ground a few weeks. Candidum should be planted in September. Plant a good-sized bulb in a six or eight inch pot.

Freessias are the better to start in the dark, but they make top growth as they root and often need bringing up in ten days or two weeks. Pot them in a mixture of half loam and the other half rotted manure. Grow them slowly and in a cool airy place. Keep them out-of-doors as long as safe, then in a fireless room as much longer as that is safe. They will then be so strong that they will stand the warmer plant room. Let them grow slowly. Not one will refuse to bloom. Freessias need plenty of water when dry but do not like a continual flood of water poured on them.

Alliums are so easy to grow no special directions are needed. Put in the dark and bring up when the sprouts are an inch high.

Anemones and Ranunculus should be planted four to six bulbs to a 5-inch pot and treated like ordinary Holland bulbs, making sure that water and temperature are moderate.

There are many varieties of bulbs, especially Lilliums, which produce elegant bloom at the hands of the florist which I would not advise the amateur to grow on account of not having the proper facilities for their successful culture. The varieties I have mentioned should afford their growers exquisite pleasure and well repay them for their time and effort.

In conclusion let me add that coming at a time when we are practically hibernating, bulbous bloom enlivens the home surroundings, creates an atmosphere of cheerfulness, and permeates its delightful odor throughout our living apartments.

I plead therefore, with those who have never grown this class of flowers to avail themselves of the opportunity, lending cheer not only to self but to all who visit their homes.

THE GLADIOLUS; WHY AND HOW.

C. R. HINKLE.

I hope to interest you in the subject: "The Gladiolus; Why and How."

Perhaps you are wondering "why" I say "Gla-di'-o-lus" and if that is "how" it must be pronounced. Let me tell you that I often say "Glad-i-o'-lus," in the way our Mothers said it, and if you choose to do likewise none but a captious critic may object, for



One of Madison's Playgrounds



Home Grown Flowers. A beautiful group of Narcissus and Hyacinth grown by an amateur who had no previous experience with Dutch Bulbs.
The bulbs cost less than a dollar

it may be pronounced either way. The Century Dictionary and the Standard Dictionary show only the pronunciation "Gla-di'-o-lus" although the Standard, rather queerly and in seeming contradiction, shows "Gla-di'-o-lus" as the generic name and the word "Glad-i-o'-lus," spelled exactly the same, as a specific name, defining it as: "A plant of the genus Gla-di'-o-lus; the corn-flag." But our old friend, Webster's International, pronounces the word "Gla-di'-o-lus or Glad-i-o'-lus." The preferred pronunciation, "Gla-di'-o-lus," is explained and justified by the statement: "The penultimate 'o' in this word is short and the accent, therefore, as Latin, properly falls upon the antepenult, 'Gla-di'-o-lus,' as indicated by most orthoepists. 'Glad-i-o'-lus' is, however, common in popular or colloquial usage."

Now, if you care to run this to earth, you will find that the difference arises in the method used in pronouncing the original Latin. If the "Roman" method is used (and the savant will tell you that is preferable), the "o" is short and you have "Gla-di'-o-lus;" if the "English" method is used you have "Glad-i-o'-lus."

So, there you are! "Pay your money and take your choice," and possibly the more money you pay or, perhaps, the more money you have, the more you will be inclined to say "Gla-di'-o-lus." I beg you, though, not to say "Gladiolas" or "Gladiolias" or even "Gladahlias," as I have heard.

The commercial grower, with labor-saving propensity, calls them "Glads" and it would seem that this is, in a double sense, a happy name, for the glorious beauty of this flower certainly "maketh the heart glad."

If the rose may be called the "Queen of Flowers" then it seems to me we may say, with equal propriety, the Gladiolus is the "King of Flowers." It is a regal and majestic flower with a richness and beauty of bloom in endless combinations of rainbow colors unequaled in the floral world. It is the crowning glory of the gardens of royalty and wealth, yet with kingly graciousness deigns to lend the splendor of its bloom to brighten and cheer the gardens of the lowly. With imperial strength it overcomes all obstacles and proudly lifts on high its royal banner to the sun.

This regal flower will grow for anyone, almost anywhere. It is strong, healthy and practically immune from disease and attacks of insects. It has a long season of bloom and is unsurpassed as a cut flower, the buds opening up after cutting equally as well as if growing in the garden. It is inexpensive and gives rich return in wealth of bloom and abundant harvest, and of all the flowers I know it is the one best adapted to be grown by everybody.

AND THAT IS THE "WHY" OF THE GLADIOLUS.

The Gladiolus has been known to cultivation for over three hundred years. Most of the hundred and fifty species are natives of south Africa, some of tropical Africa, southern Europe and

western Asia. Only a few of them are desirable, except in the production of hybrids.

The history of the modern *Gladiolus* dates back only about seventy-five years, when there originated a hybrid very superior to the type, which was named the "Gandavensis," after the Belgian city of Ghent, (Gand) where it was produced. On coming into public notice this variety placed the *Gladiolus* among the favorite garden flowers and it increased rapidly in popularity with the introduction of still more beautiful and desirable sorts which followed, such as the *Lemoinei* and *Nanceianus*, produced by Victor Lemoine, of Nancy, France, and the beautiful production of Max Leichtlin, of Baden Baden, Germany, which was sold to John Lewis Childs of this country, who gave it his own name, *Childsi*, upon placing it upon the market. From these and their various crosses and hybrids has come the modern *Gladiolus* in all its glory.

Cross-pollination or fertilization has produced many thousands of beautiful varieties, in practically all shades and combinations of color and forms of marking and shading, until it would seem the limit had been reached, yet the work of the hybridizer goes on and today there are hundreds of growers engaged in the production of new varieties in countless numbers, from among which the best and most desirable are saved and put on the market.

In the survival of the fittest there is taken into consideration size and substance or texture of flower, brilliancy of color and beauty of combinations and markings of flower, form and number of flowers on spike, length of stem and spike, strength of constitution and growth of plant and reproductive quality.

The *Gladiolus* is propagated in three ways: by division or increase of the parent bulb; by bulblets growing at the base of the new bulb, and by seed. The first two ways produce blooms like the parent, but blooms of seedlings all differ from each other. Theoretically, no two are alike. From this method of propagation the new varieties originate.

Speaking with strict accuracy, the fleshy subterranean body of the *Gladiolus* is not a bulb, but a corm, and the so-called bulblets are cormels, but the use of the term bulb is practically universal and I will use it as it would seem pedantic to use the other.

And in this address I will not treat of the early-flowering or so-called "Winter-blooming" varieties, which are negligible as compared with those of the summer garden.

The essentials of *Gladiolus* culture are simple. Give full exposure to sun, a soil fairly rich, plenty of water and thorough cultivation during the growing period.

SOIL.

A sandy loam soil is best for the *Gladiolus*, but it should be sufficiently firm to afford some support to the plant and not wash

away in rains. An ideal soil would be sod, plowed in the fall, left rough through winter and in spring thoroughly worked and pulverized. If not sufficiently rich, a potato phosphate or any complete commercial fertilizer may be safely applied if worked in when preparing the ground, at the rate of five or six hundred pounds per acre. Manures may be used if well-rotted and covered in below the planting depth, preferably during the preceding fall. If conditions make it inconvenient to apply the fertilizer before planting, good results may still be obtained by preparing a liquid fertilizer from pulverized sheep manure and applying about the plant after growth has started. Never use fresh stable manure if possible to avoid it. In any event use only if applied in the preceding fall and allowed to lie and leach during the winter. Stiff, heavy clay soil should be lightened by the addition of humus or sand, so that it will conserve moisture.

PLANTING.

By planting at intervals of two weeks, from the middle of April to the first of July, in this latitude, a succession of bloom may be had from July first until frost. You may risk planting a few a little earlier, if in a sunny and protected situation, for the early planted ones will be slow coming and probably not put in an appearance until danger from frost is past. And they are not so tender as is sometimes thought. I have known sprouts several inches high to be caught in a late snow, and even frozen slightly, yet come through it without damage, producing flowers before the end of June.

If you are planting only a moderate quantity, plant the smaller bulbs first, the greater substance of the larger ones permitting them to be kept longer. (By the way,—if you get the “*Gladolus Fever*” that word “moderate” will become very elastic.) If planting on an extensive scale make plantings at slightly longer intervals and let large and small bulbs go together as they run at each planting, which will give succession of bloom.

If planting in beds or clusters for ornamental purposes open spaces between bulbs may be left in the earlier plantings in which others may be planted later, providing for succession. Ornamental plantings should be in irregular clusters to avoid stiffness or formality and appear most effective when displayed against a background of shrubs or evergreens. Planted among peonies, larkspurs and other early blooming perennials they furnish a needed and pleasing succession of bloom through the summer and fall.

Field planting should be in rows twenty inches apart, so they may be cultivated with the wheel hoe, that preventer of “Gardener’s backache.” In extensive planting requiring use of horse cultivator the rows should be three feet apart. Plant bulbs four or five inches deep, according to whether the soil is heavy or

light, and from four to ten inches apart as place or character of planting may make desirable. In field planting the space between bulbs may be decreased to as little as two or three inches if room is limited and if growing for bulb production only, plant in double rows.

Bulblets may be planted quite thickly, as many as three or four hundred to the foot of row, so the delicate grass-like shoots may unite their strength in pushing through to the surface. Plant in flat-bottomed trenches five or six inches wide, covering them a couple of inches deep, then drawing the soil up in a ridge a couple of inches high over the row. This permits stirring with a steel rake when the first weeds appear, which weeds will do even in the best regulated garden, and even another raking when the second crop of weeds starts growth, without hurting the tops of the little plants. This plan of ridging up after planting is worth practicing on large bulbs as well, for by this method most of the weeds will be easily disposed of and hours of more arduous labor saved. Before planting bulblets keep them moist awhile, until they show signs of germinating, as most all have an extremely hard shell covering them and may be slow in starting or even refuse to come up at all unless given this preliminary assistance. Two years are usually required to bring bulblets to blooming size.

Growing from seed requires particular care. The soil must be good and in the best of condition. Plant seed rather thickly, after fashion of bulblets, an inch deep. Cover, and then after moistening thoroughly, place burlap over them, to conserve moisture and prevent crusting. Keep covered and moist until growth is well started and keep free from weeds. Two years are usually required to get blooming bulbs from seed. The labor and care given seedlings will be forgotten when they arrive at blooming size and you see for the first time new varieties that have never before bloomed in anybody's garden, and possibly find among them some of superior merit and value.

CULTIVATING.

While the *Gladiolus* does not demand petting and will stand neglect with more fortitude than almost any other flower it responds readily to good treatment and well repays care in cultivation. To accomplish best results it is essential that the soil be put in good condition before planting, that weeds are kept out and that the surface be constantly kept loose and free from crusting or baking.

It is also desirable that the tops be protected from being broken down by winds, particularly after the flower stalk grows sufficiently for the buds to attain size and weight. Damaged tops mean damaged bulbs. In small plantings they may be staked but in large plantings where that is impracticable protection may be afforded by ridging up the soil on each side of the row when

using the hoe or plow so that by the time the stalks get heavy they will be braced by six or seven inches of earth. This not only serves to support the stalk but benefits the bulb by keeping it cooler and moister.

WATERING.

The dust mulch made by proper stirring or cultivating of the ground usually conserves moisture sufficiently to make artificial watering unnecessary except in times of protracted dry weather. The earlier plantings are not likely to need more water than Dame Nature will give them, but the drier days of summer may cause later plantings to need artificial watering. The rule may be, water only when necessary and then give plenty. Do not sprinkle, water copiously. "Soak it to them." Irrigate if possible. Bear in mind that cultivation must be resumed just as soon as the ground may be worked, after each rain or watering.

CUTTING.

The object in growing will determine manner of cutting the blooms. If growing for bulbs only, the flower stem is cut as soon as it appears and all leaves left to feed and develop the bulb, which derives much of its sustenance from the foliage. If growing flowers for cutting, then it will be desirable to cut some of the leaves with the flower stem. Understand that the more foliage is cut off the more the bulb will be dwarfed. Most varieties, however, will furnish a sufficiently long stem for cut flower needs and still leave from four to six leaves to bring the bulb to maturity. Unless seed is particularly desired do not allow it to form as this will surely exhaust and dwarf the bulb.

HARVESTING AND CURING.

Three or four weeks after blooming is usually sufficient to mature the bulbs, so that digging may then be done if circumstances require or they may be left in the ground until the first frost comes, after which we usually have ideal weather for curing. In digging, use a cultivating or spading fork. Sink it beside the row so that upon prying with it the bulbs will be raised in the loosened ground which will usually open at the stalks and permit the bulbs to be lifted out by the tops and the soil cleanly shaken from them.

If weather conditions permit, leave the bulbs lying on the ground with tops and roots on for several days so the sun and air may cure and harden them up. When this seems to have been fairly well accomplished, take them up, clip off the tops a few inches from the bulbs and store bulbs in crates in a dry and airy place safe from frost for a little further curing. These crates should be not more than four inches deep and should have ventilated bottoms, preferably of No. 6 screen wire, which will pre-

vent the loss or mixture of the bulblets. In two or three weeks it will be found that the old bulbs can be most easily and readily removed and at the same time the remainder of the stalk or top. This operation usually takes with it the first or outer husk or fibrous sheath that covers the bulb, leaving it in a clean, silky attractive condition. Do not remove the rest of the coverings but leave them for protection of bulb. At this time the bulblets may be separated from the bulbs and old roots.

Some growers say to remove the old bulbs and the tops immediately on taking from the ground. I venture to deny the correctness of such practice. I believe the bulb will cure better if the top is left on for a few days as the sap from the leaves seems to go into the bulb, following its natural order of procedure, making it plump and firm. Moreover, if the top is taken away from the bulb when first taken up it will be found to hang very pertinaciously and will tear and lacerate the sheaths, which are then soft and fleshy, but after a few weeks the stem shrivels to a mere shred at its juncture with the bulb and readily comes away. The old bulbs and roots also adhere strongly when first taken up but as the curing nears completion they may be pushed off with a very minimum of effort.

STORING.

Put bulbs in crates and rack them up in such manner as to allow circulation of air. Store in cellar or other frost proof place where the temperature is uniform and around forty to forty-five degrees. Small quantities may be put in paper bags. Keep dark, if practicable. Toward spring examine, and if found sprouting, lower the temperature, if possible, and turn them at intervals. Bulblets should be stored in boxes or bags, with a small quantity of soil, so that they may not dry out too much and harden their shells.

AND THAT IS THE "HOW" OF THE GLADIOLUS.

Those who wish to know more of this most desirable flower which is so well worth knowing should read the only book on the subject, "The Gladiolus," by Mr. Matthew Crawford, the "Dean" of the Gladiolus school in America, and subscribe for "The Modern Gladiolus Grower," a most interesting and helpful monthly magazine, published at a small price by Mr. Madison Cooper, Calcium, N. Y.

The Gladiolus is the flower for everybody; I wish that everybody would grow it. To see it excites admiration; to grow it excites enthusiasm. The King of Flowers is the Glorious Gladiolus.

A teacher required her children to write what we used to call a "composition" but which is now called a "theme." She said: "Do not indulge in flights of fancy, or copy the writings of others; simply say what is in you." The production of one youngster was: "Teacher says not rite any flites of fancy but just tell

what is in us. In me there is my stummick, lungs, heart, two cookies, two apples and my dinner."

I have endeavored to tell you "what is in me" about the Gladiolus.

But do you observe that even I do not seem to be able to make a talk on another subject before this Society without referring to "Apples?"

FLOWERS OF MERIT NOT GENERALLY GROWN.

J. F. HAUSER, Bayfield.

So many good things among the annuals are so little grown that I thought perhaps it would be well to call attention to just a few that are really worthy to be in any garden in addition to those generally cultivated.

The success of the person growing corn or potatoes depends very largely on growing just one variety. He should not seek to grow too many kinds. It is different with the person in the flower garden, the florist. If he is really interested in floral culture he is constantly seeking for more—something new to add to his flower garden every year.

For a good border plant beside the sweet alyssum and pansy, is the Swan River daisy. It is an all season bloomer of easy culture and hardy.

The centurea of the sweet sultan type is a plant we seldom see in the gardens. To my notion it ranks third as a cut flower in value, among all the annuals; excelled only by the aster and sweet pea. It is about the earliest in bloom and continues until killed by frost. Very hardy. Colors: white, purple and yellow.

The Clarkia also deserves to be grown more. It's a plant that adapts itself equally well to either sunny or partly shaded places. Colors: white and various shades of scarlet. Height: two feet; hardy.

Another very good annual is the African daisy. The new hybrids of the old golden daisy are simply marvelous in colors. From pure white through the various shades of yellow and orange to rich salmon shades. There are color combinations that you have not in any other flower in the garden. They are of the easiest culture and like a light soil in a sunny situation best. Anyone that wants a dazzling flower bed cannot fail in trying these daisies.

The Godetia with its azalea-like flowers is very attractive; fine for solid beds and shady places, where so very few flowers do well.

Hunemanian, similar to the California poppy is very pretty. Will last longer as a cut flower than any other of the poppy family.

Salpiglossis, or sometimes called velvet flower is a very good one. In a collection of annuals at the fair it attracts more attention than most anything else; and the questions asked concerning it prove it is very little grown. It resembles the Petunia but more velvety in color. Hardy and easily grown. A wide range of colors.

The "Everlastings," we see so few in the gardens. Helichrysum is probably one of the best of the straw flowers; these with some ornamental grasses make fine winter bouquets.

Adonis Lupine Scabiosa are kinds that will help to complete the flower garden.

At last, would like to call attention to growing Dahlias from seed. It is surprising how very few people grow or know that Dahlias can be grown from seed just as any annual. I cannot understand why seedhouses do not recommend their growing more, unless it be that there is more money in selling the bulbs than seed.

They start very easily and come in bloom as soon or sooner than those grown from the bulb. I know of nothing more interesting than watching for something new coming into bloom. Last season we had a few single specimens that measured six inches across.

Then there is a novel type called the collarette, having a row of short petals around the center which are always different in color from the regular petals. This class seems to come quite true, as there were very few that did not have these special markings. By all means grow a few Dahlias from seed as you will always find something worth while keeping, and in a short time you will have a good collection that will not have cost you much, and is different from that of anybody else.

Now just a few general remarks about the sowing of flower seeds; most of us have failed in that the seeds do not come up, and then we blame the seedsmen when after all, we are at fault.

All those that will transplant, sow seeds in boxes, cold frames or hotbeds. Use a sandy soil, rake or sieve the topsoil just as fine as possible, then level the soil perfectly, so when watering it will not wash, and the water only runs to the depressions of your bed. Now press the soil firm with a board, next mark your rows very lightly four or five inches apart so as to give room between to work with a weeder. Now scatter the seeds evenly along the marks and press the seed in the soil with your finger, in depth according to the size of the seed.

In sowing seed in frames with a covering you can guard against splashing rains washing the seeds out. Your soil will not bake in a covered frame as it will in the open. A hard crust is

probably the principal reason why so many times flower seeds will not come up.

When plants are large enough to transplant where they are to grow, plant in rows, and do not crowd. By giving lots of room you can work in them much later in the season, thus keeping down weeds and holding moisture. Your plants will be stronger, more stalky; will resist drought, insects and disease much better than where they are crowded. And you will have much better and larger specimens of flowers. Give them lots of room.

SIX SHRUBS AND TWELVE HARDY PLANTS FOR EVERY HOME

W. A. TOOLE, Baraboo.

There is a multitude of varieties of ornamental shrubs and perennials that are hardy in Wisconsin. Most of them possess considerable merit and are useful in the planting of relatively large borders or on large estates, where proper care may be given them. Some of them possess such all-round good qualities in the way of beauty, hardiness and ease of culture that they are suitable for planting around every home. We probably all have read and know that the orthodox way to plant our grounds is to mass the shrubs and plants along the borders of the yard or lot, and against the house or other buildings, with the larger part of the lawn left open and clear. This plan presents much the finer appearance to outsiders and may give just as much enjoyment as any other to the home people if well planned. I am well aware that it is much easier to draw a plan for the planting of an imaginary home than it is to meet all the demands of a home already established, especially if the room and means are limited. And so I will confine my talk to the special fitness of the different varieties that I have selected as best suited for general culture.

Of the half dozen shrubs that the title of my paper calls for, I would head the list with the old-fashioned lilac. Easily grown, beautiful, fragrant; it meets the requirements of a shrub for every home. The lilac is one of the taller growing shrubs and appears to best advantage planted against large bare spaces of wall, or as a screen to the back of the lot. It must have a reasonable amount of room and plenty of sunshine if fine flowers are to be produced. If the old flowers are clipped off as soon as they have withered the green foliage will appear to advantage the whole of the summer. The trimming out of the withered flowers seems to promote the formation of more flowers the next year. Besides the old-fashioned lilacs that we are so familiar with there are many improved varieties, white and various shades of purple, single and double, for those who care for them.

Spiraea van Houttei, known to many as the bridal wreath, is a general favorite. It is not nearly so tall growing as the lilac and in combination with the Thunbergs barberry and *Hydrangea paniculata* is largely planted about houses where the room is limited and the best effect must be secured in a limited space. The fountain like mass of white flowers of this *spirea* produced the last of May or early June are not its only beauty, as the graceful form of the shrub and the beautiful foliage make it a summer long attraction. A few of the older stems need trimming out each year after blossoming time.

Hydrangea paniculata grandiflora alba is about as big a mouthful to pronounce as the names of some of the Russian or Austrian cities. Fortunately it is much easier to grow than to pronounce. Most of our shrubs blossom in the spring, but this *Hydrangea* blooms in late summer or early fall, when few other shrubs are showy. The great heads of creamy white flowers are rather stiff and lack fragrance, but are admired by many. The largest heads of flowers will be produced if the branches are cut back to within a few inches of the previous years growth each spring. *Hydrangea arborescens* or the snowball *Hydrangea*, more recently introduced, blossoms in June and the flower heads are whiter in color. It will not stand as much drought as some other shrubs.

Thunbergs barberry is low growing and is much used for low hedges and in front of other taller shrubs. An attractive combination near the house or in limited space is one or more *Spiraea van Houttei* in the background, stepping down to Thunbergs barberry in front. The yellow flowers are not conspicuous but the foliage looks well all summer, and the bright red fruit gives a cheery appearance after the leaves have fallen.

The Japanese rose, *Rosa rugosa*, is fast winning favor as an ornamental shrub. The large deep pink or white single flowers are most plentiful in June, but scattering flowers appear the whole summer and in the fall the large red seed pips, some as large as crab apples are quite showy. The most attractive feature is the glossy deep green foliage which is beautiful from early spring till the leaves ripen.

It is not easy to choose our sixth shrub, there are so many that might be given the place, but I have chosen the pink tartarian honeysuckle, for it is easy to grow, flowers freely during its season, and the foliage is fresh appearing all summer. The bright red fruit is attractive until the birds tear it to pieces.

On small grounds where but few varieties may be grown this matter of foliage is of more importance than the flowering qualities, as the foliage must be depended on to keep up appearances during most of the summer.

There is a host of herbaceous plants that are hardy in Wisconsin and they are gaining in favor every year because of their beauty, variety and permanent character. It must not be sup-

posed that they require no attention whatever. They require a reasonable amount of cultivation. Blue grass and other weeds must not be allowed to crowd them out. Some winter protection is desirable. Nor must it be supposed that they will live forever. Most of them are suited to the hardy border, either with other perennials or with shrubs, and many are suited for planting for cut flowers alone if they are not wanted for landscape decoration.

The hardy phlox is probably more planted than any other one kind. It is not high in price, gives quick results, is not hard to grow, and may be had in a great variety of beautiful and showy colors. It is further desirable because it will endure partial shade better than most other flowering plants.

The peony is a great favorite, but the plants cost more to start with than other kinds and are slower to give of their best. The peony is beautiful in the border when in flower and the foliage is fresh and attractive most of the summer. Their beauty as a cut flower makes them worthy of planting for this alone. There are probably several hundred acres now planted in this country largely to supply the trade with flowers for Memorial day. For best results peonies should be planted during September or October. They then have a chance to form roots before winter sets in, and will flower some the next spring. There are hundreds of varieties of peonies offered, covering a wide range of colors, and forms of flowers. It is impossible to do justice in describing varieties in the short time allotted to me.

The German iris is very hardy, easily grown, and there is a wide variety in color. The season of blooming may be extended over six weeks time beginning with the short stemmed early varieties and through to the end of the season. While sufficient moisture is necessary during the flowering season, they need a well-drained soil and will not thrive where the soil is low and soggy. The Japanese iris is hardy to a moderate degree in this state and is wonderfully beautiful, but is not sturdy enough to be recommended for general culture. It requires more moisture than the German iris but will not do well in as wet ground as our native blue flag.

In Europe, especially in England, where the hardy garden is most in favor, the Delphiniums are probably the most in evidence of any.

The different species and mixed hybrids may be propagated from seeds, while the named varieties are increased by division. The various shades of blue and purple give a touch of color not quite supplied by any other hardy plants.

The old-fashioned bleeding heart certainly deserves a place in every garden, but as the foliage ripens early in the season, it should be planted in such a position as not to leave an unsightly gap in the border when it is out of season. It forces readily in the winter and seems to blossom more freely than it does out-of-doors.

The Gaillardias, Coreopsis and daisies of the Shasta daisy class are especially valuable for cut flowers although they have their place as well in the border. They are of uncertain hardiness but are easily raised from seed and a supply for renewals may be easily kept up in this way.

The hollyhocks and golden glow are especially suited for planting in the background among shrubbery or against walls or buildings as a screen. Most of the other perennials show to best advantage in front of taller growing shrubbery. The hollyhock can really only be classed as a biennial as it is of doubtful hardiness after blossoming. The hollyhock rust often kills the plants even before they have blossomed. Spraying with Bordeaux mixture will check this disease.

There are a number of kinds of Aquilegias or columbines, all very beautiful, especially the long spurred varieties. They are well suited to planting in the front of the border, or in shady spots in the rockery.

As with the shrubs it is difficult to decide on the last one for there are a number more of hardy plants that are not difficult to grow, are beautiful, and if room permits deserve a place in the garden of the common everyday American home. Because of its general popularity I will mention the lily of the valley. Given a top dressing of manure in the fall or winter it will thrive most anywhere.

These different varieties have been named separately, but appear to best advantage when the shrubs and hardy plants are combined in the hardy border. This should be somewhat irregular in outline to avoid a formal effect with the taller growing kinds at the back. Do not plant too closely and try and plan the planting so that there will not be any unsightly spots at any time.

It is not necessary to do all this planting the first year. If forethought is used, a few may be added annually till the desired result is obtained.

DISCUSSION.

A Member—How do you manage the bleeding heart for forcing?

Mr. Toole—We take up the roots along in the fall before they freeze in the ground solidly, and they can then be potted or boxed up and put in the cellar. I think they will force more easily that way. They are later brought into the house, into the living room, and given water and warmth, and they will force along quite readily. Treat them quite as you would by packing them in flats, except that you would not keep them in the dark.

A Member—In addition to the perennials that Mr. Toole has mentioned I have found at least three of the most satisfactory to be goldenrod, orange milkweed or butterfly weed and spider wort, all of which grow wild and can be obtained anywhere. But they do so much better in the garden that one would hardly recognize them after a while as wild flowers.

Mr. Toole—That is true of a number of others of our natives. If we give them a chance in the garden, they will do so much better than they do wild that very often we hardly recognize them. They will often grow in the garden in soils we would hardly expect them to grow in, finding them wild. Take the cardinal, the lobelia. It is usually found growing in very wet places and still seems to do well in any ordinarily rich garden if the weeds are kept away from it, if it is kept cultivated.

GARDENING.

J. W. ROE, Oshkosh.

We do considerable winter gardening under glass. Leaf lettuce is our main crop in the greenhouse. We raise some parsley, a few radishes and green onions.

We find lettuce is more in demand than radishes or onions in the winter season. The Grand Rapids Forcing Lettuce is the kind we grow as it is hardier than the other leaf varieties and holds up better after it is cut. Moss curled Parsley, Early Globe forcing Radish, large onions that have started to sprout, make up the balance of our crop. We usually grow five crops of lettuce and then plant the house to white spine cucumbers which have been started in pots in midwinter.

We also have bedding plants such as Geraniums, Cannas, etc., coming on for spring sales. We have hotbed sash and frames that are made ready for use early in the spring.

In these we grow lettuce and radishes, also our vegetable plants for field culture—tomatoes, cabbage, peppers, etc. We grow a quantity of plants for the local market and do considerable shipping of garden plants to outside points where the local gardeners have not been able to supply the demand, and we find this plant growing end of the business more profitable than the lettuce and raddish products from our frames.

I must not forget to mention that we sell a lot of pansy plants in bloom just before Memorial Day and that our business in plants is growing.

We find our cold frames crowded for space while we are getting our plants ready for the field.

There are so many plants we start now that we did not a few years back, such as muskmelons, cucumbers, Hubbard squash, Bush squash and Lima beans. We find it pays well to do this with the melons and squash—we are sure to get a good stand in the field and do not have to fight the striped fly. We get our crop earlier on the market and of course command better prices. This season our melons were practically all gathered before the field sown melon came on. We grow the Milwaukee Market Melon and save our own seeds. When we gather an exceptionally fine looking melon we decide at once it is too good to sell. So we appease our conscience for eating the melon by saving the seed, while the idle rich must be content with the ordinary run of melons from the field. I have tried several different ways of raising melon plants (what I say here will apply to squash and cucumbers as well) and have had more or less success with them all. We have used sods cut in four in. squares, berry boxes, clay pots, paper pots, and earth bands, but I favor using *Stagnum* moss over all these methods.

I fill shallow flats with this moss, scatter this seed thinly over the moss and cover lightly with a little more moss. We find that the seed germinates quickly with little danger of rotting. After the plants are up we do not force them but rather hold them in check. When the second leaves are well out they should be planted in the field. We plant one plant in a hill 4 by 4 feet each way. We sprinkle the flats before taking them out to the field and plant directly from the flats. A good pinch of moss clings to the root of each plant so that the plant is hardly disturbed, and at the same time the moss holds sufficient moisture to give a good start to the plant without further watering. Squash are handled the same as melons and cucumbers except of course we give the plants more room in the field.

We grow several acres of tomatoes each year. The plants for this crop are also started in the beds or the greenhouse, usually in paper pots for the earlier planting. We figure to plant in six different plantings of about two acres each, and we have the plants come on so that the last planting comes the last week in June and the first about the middle of May. This gives us a succession of good tomatoes for shipping until frost. We grow the Buckstaff and Livingston Beauty. I save my own seed.

For early cabbage and cauliflower I find only a limited market in our section. Early Jersey, Wakefield cabbage, Snowball cauliflower are our standards.

Sweet peppers are one of my best crops. For these I find a growing demand. On rich moist soil they produce abundantly. We plant a strain of early large Bullnosed pepper, both red and yellow, and are very particular that we have no hot peppers on the place to mix with them. It is important to get the genuine sweet pepper. I have taken considerable pains to keep my seed

right. After several failures to get good seed I decided to go to the Italian grower in Illinois for my seed. I had up to that time been unable to compete with these people, but now find that my peppers are acceptable to the most fastidious epicure. We get out our plants as soon as danger of frost is over, setting in check rows two by four feet. Two hundred Black Beauty Egg Plant fills the bill for us. We handle them in the seed bed and in the field the same as the Peppers, except that we give them a dose of arsenate of lead, else the gay and festive potato bug would likely scramble our egg plant for us.

Springtime means days of hustling and long hours. The man with the eight hour bug in his head should never attempt gardening, but ought to get into the government service where they raise salaries instead of vegetables. Our wagons at this time go to town loaded. Combined with the cold frame products come the early field grown vegetables, namely, bunch onions, asparagus, pieplant, spinach, and parsnips, followed by green peas, wax beans, etc. The demand for all these early crops has been great, the reward liberal.

I sometimes think if I could arrange my plans so as to quit gardening the middle of June until the first of August I would make more money. It is at this time that the market is flooded with garden truck raised by the wives and children on the nearby farms. The competition we have to contend with where the cost of production is not considered is discouraging. Woman and child labor often represents the labor expense and the farmer figures his sales in this line as all gain. However this may be, I continue to sow and plant each successive crop and look for some profits from each. Bunch beets, carrots, onions, garden radishes—all these bunching vegetables—bring in some money and give employment to our regular garden helpers. At least some one gets benefit and we are able to keep our help for the time when we need them for gathering in the fall crops. I use the Crimson Globe for table beets. We sow twice, in April for early, first of July for winter use. Chantenay carrots are seeded the same time with the beets. Guernsey parsnips and oyster plant we sow early and only once. All these vegetables are given rich loose garden soil, well drained. The beds are somewhat raised and the rows seeded eighteen inches apart.

Field grown radishes and lettuce always sell with us, especially after the first rush of the little home garden product is over and the spring fever for planting has abated. We sow a small patch once a week of each. What remains unsold we plow under and reseed so that we always have radishes and lettuce young and tender.

During the heat of July and August we have found difficulty in keeping up a supply of these table relishes. Of late we have

used the Skinner system of irrigation and find we can now grow good radishes and lettuce in the hot summer months.

I have about an acre of black sandy soil near the lake which has grown onions for forty years, probably more.

This piece of ground has always produced fine crops of Yellow Globe onions except when high water in the lake has flooded the field for too long a time. This does not occur often and we usually have a profitable crop. I test my seed and if the test is good drop 4 to 6 seeds to the inch in rows 12 inches apart. This may seem rather thick but I find it easier to pull out where the stand is too thick than to fill out a poor stand. This field is fertilized every year with composted manure to which we have added considerable wood ashes from time to time.

The Danish Fall cabbage and cauliflower also has quite a place in our garden.

Green peas and sweet corn we try to keep coming in successive crops. Golden Bantam sweet corn seems to have captured our market and the Laxatonian pea has done the same trick.

Our main hold on the gardening business has been our tomatoes. We have packed tomatoes and shipped to outside towns for years. Our business has increased—we have created a market, by putting up a fine article in a popular priced package, by the uniformity of our tomatoes, and prompt shipments. Our buyer stays with us even if at times he could buy cheaper elsewhere.

I spoke of the Buckstaff tomato as one of our varieties used in our trade. This strain of tomato is only known locally as yet. We have perfected the strain by selection until now we plant it for our early main crop, and most of the gardeners in our section grow it also. This tomato bears the name of a well-known manufacturer who takes a lively interest in horticulture and is a life member of this society. Mr. B. gave me some seed of an early tomato he had in his home garden and advised me to plant this tomato for market along with some strong growing smooth variety. I raised a few hundred plants the first year and planted them in alternate rows with Stone.

The tomatoes from his seed proved to be very early and exceptionally rough. We took seed from some of the most vigorous plants and planted them the next year again with Stone. The second year we gathered a number of smooth tomatoes from these vines. These were grown in turn by themselves, after the first two years.

Mr. Buckstaff has helped me select seed tomatoes from these vines from year to year and has taken a great interest in helping to produce a good early smooth tomato. To distinguish the seed from other kinds I marked it Buckstaff. Now I am glad that I did because it proved to be a good thing. It is my best medium early tomato and biggest cropper, and is less affected

by rot than any other kind. Altogether I value this tomato very highly. Mr. Buckstaff has been active in promoting good farming, careful gardening and scientific fruit culture for years. His garden is his hobby.

I have found that there is always a market for garden products whether it is little or much one has to offer. So I have combined gardening with the growing of tree fruits. It often happens that the fruit crop turns out light, then I have a revenue from the garden to depend on.

In this we have an advantage over the fruit growers of the west where most of the population of a fruit section are engaged in the same business. They grow their own vegetables, raise their own eggs and other necessities, but when it comes to selling any of these things they find no market. Consequently they have nothing else to depend upon when the fruit crop fails them.

I advise those whom the lure of the land has overtaken to settle on Wisconsin land. For here he may produce to advantage almost everything man needs. And if he is industrious the results of his labor will produce for him and his family every advantage necessary and most of the good things that go to make life pleasant. This is easily proven by the many commodious homes in the rural districts.

DISCUSSION OF THE MOST SUITABLE PACKAGE FOR WISCONSIN APPLES, WHETHER THE BARREL OR THE BOX?

(Led by President J. S. Palmer.)

THE BARREL.

Mr. Palmer—This is to be an informal discussion.

We have until very recent years packed nearly all the apples of Wisconsin in barrels. Of late years the western methods have appealed to some who have been trying the box method to some extent. Of course there probably is no dead line which we must cross in this matter. If we can sell our apples to better advantage in boxes, than in barrels, of course we should pack them in boxes.

The question is, whether Wisconsin apples will carry better and sell better in boxes than in barrels. I have found that the barrel is a very solid and secure pack for apples, and I believe they will be carried to the market in better shape than in any other way that we have ever found. If you will observe expressmen or any man who is handling a package, when they are handling anything that is square, that has got a square side any-

where, they seem to take special delight in striking that side as hard as possible. A barrel is so constructed that it is almost impossible to strike on a hard foundation anywhere. It is always ready to roll, and in that respect will stand harder handling than any other package.

We are easily led astray when we read about the high prices that are paid for the western box apples as they come in here. They do sell sometimes at a high price, and we wonder why we shouldn't sell our apples at an equally high price. I have a catalogue or price list that came a day or two ago from Chicago quoting apples for the Christmas trade, and it has some very peculiar things in it. I notice one thing, that the fancy Jonathans are quoted there at \$5.50 per barrel, while the same apples in boxes are quoted at \$1.55. It is not the quantity, it is the quality that counts. If you have the quality, my experience has always been you can command higher prices in barrels than in boxes. Wisconsin Snows are quoted at \$4.00, which shows that we have a quality of apple in Wisconsin which can be placed on the market to compete with anything in the east, when we read that New York apples of the same kind are quoted in barrels at \$2.40. Our Wisconsin Snows are next to the highest quotation of anything in this list.

I have tried packing box apples to a limited extent, and I have found that it is rather a hard job to put up apples in the proper way. I do not consider that the so-called "jumble pack" can be considered in boxing apples, but the proper packing of box apples is rather a difficult matter, depending very largely on the grading and that makes it quite an expensive proposition.

I see by "Wisconsin Horticulture" that the estimated cost of packing a barrel of apples, packing, hauling and marketing, with the expense of the barrels, all included, is about 80 cents, which I think is rather high for Wisconsin conditions. In box packing the cost of packing three boxes would be about \$1.17, which would be quite a little in favor of the barrel in expense. Of course if we have apples of the proper quality to pack in boxes to compete with the western apples, it might be all right, but I do not think we will ever accomplish anything by trying to imitate their methods with anything but the very highest quality of Wisconsin apples. We have two or three apples grown in Wisconsin that will probably equal if not excel anything grown anywhere as to quality. But I have seen Wisconsin apples packed in boxes, such varieties as the Hibernial, which we might call cooking apples. This might be all right for the local market, but to meet in competition with the western box apples in the city markets, I think it would have an effect of placing Wisconsin in a very bad light as to quality. I do not mean that Wisconsin apples are not of an equal quality, but if we do box apples, let us box apples that are equal to or better than the quality that

is already selling in boxes, and only those. Do not try to compete with the western box market with low grade fruit. We raise too much of that low grade fruit in Wisconsin, and I think in the future we must cut out many of the varieties that we have been raising and grow in the future only the better varieties, such as the market demands.

Wisconsin apples are of a different nature from those grown under irrigation; the western irrigated apples have a dry, corky condition, and they stand boxing much better than our Wisconsin apples, but they are not half as valuable. Our Wisconsin apples are more juicy and they will not keep under the conditions that box apples are subjected to, as well as the western box apples, and in that respect I think we must be very careful in boxing apples, or they will not carry to market and arrive in the proper condition. As I said before, this is perhaps not as essential in the local markets as in shipping to the city markets, the latter is the market that I have considered.

I have taken up this matter with different commission men, and they express a preference for Wisconsin apples in barrels; they say they can handle them better, that the trade can handle Wisconsin apples better in barrels on this account, that the higher flavor and the more juice in the apples they handle, the better they will carry in barrels than in boxes. I have almost entirely discarded the box. I have never tried to ship very many in boxes, and those that I have tried have never been very satisfactory, they have never carried as well as they do in barrels. If we can succeed in packing and putting up a grade of apples that are wanted in the market in boxes, so that they can carry as well and sell better, of course I see no reason why we should not do that. But, from what I can see of the city market at the present time, there is no premium on box apples. In other words, the same quality of goods placed in barrels will bring as much money as in boxes.

THE BOX.

(Led by F. Kern.)

The apple box is a very simple affair and a container with which practically every fruit grower, and many who are not fruit growers are familiar, but because our genial secretary and myself happen to differ as to whether it is the proper package for Wisconsin or not, he has seen fit to vent his spite on *you* by putting *me* on this program to discuss the good qualities of this humble box and I hope to prove to you that for our use in Wisconsin the box is the proper commercial package for apples. This I will

do by citing my experience in handling apples, which, by the way, has not been very extensive. In my business I adopted the box in preference because it would not cover up the iniquities of the apple business, for, as you know, and as everybody knows, it is and has been for years the general opinion that all good apples were to be found on the top tier of the barrel, and I am sorry to confess that this general impression has foundation and still holds in practically every instance.

For the fraternal and friendly feeling I hold for my opponent who has preceded, I am going to except him as one packer in Wisconsin who does have a few good apples below the top tier, for I have seen some of his barrels of apples on exhibition at the state fair, but, generally speaking, I say the impression is correct and now after this impression has obtained for years the package itself, the barrel, is being condemned because apple dealers do not as a rule retail a whole barrel of apples to a customer, more often a peck or a bushel. The customer who sees the top tier of apples under a wire screen cover is attracted by the excellent quality shown and orders a bushel. The grocer does not disturb this picture barrel, but instead, fills the order from a barrel that he has filled an order or two from, and when these apples are delivered and opened in the home, they are disappointing, to put it mildly, and I contend such practice is very detrimental to the apple industry. I will venture this statement and never expect to hear it challenged, that the apple market never has been and never will be so overstocked with a No. 1 pack and grade, no matter in what package, that they will not get the grower a handsome return in the middle west section. Barnum said people wanted to be humbugged. This statement as applied to a circus is invariably so, but it is not so with apples, but on the contrary, they are humbugged every time they buy a barrel of apples, and they are helpless. In New York state, they have realized so keenly the iniquities in the apple business that the legislature has passed two apple bills within the last three years, the latter penalizing the grower who packs and misbrands a barrel of apples. The law allows the grower or packer to pack and sell any kind or grade of apples so long as he does not misbrand the barrel after it is packed. And yet with all the laws and all the penalties, I just received a car of apples that I bought for fancy A grade, nothing under 2½ inches. What did I get? I got stung. No, I didn't either. I would have if I had not refused the car and gone without apples.

I tell you the apple does not look the same to the packer as it does to the consumer, and the barrel is without question the best package on the market for mixing in poor grade apples and covering with a fancy face.

Perhaps it is not fair for me to prove my argument by condemning the barrel as a package. Perhaps I should prove why



Bayfield apples packed for shipment by Parcel Post

the box is a better package than the barrel. I do not consider this necessary for I think we are all of the opinion that the box is the proper container.

In the first place the pack in a box must be honest or it will be detected. With the barrel, usually the buyer inspects the branded end which is always the face because the end is not nailed so securely as the bottom. They see the best of the barrel and once the sale is made and you have your money you feel satisfied until some one else raises a rumpus and then it is usually too late.

With the box, it is nailed on all four sides alike and is never opened for inspection on the face, usually on the side. With strictly No. 1 apples there are from four to five tiers in a box either way. By opening the side and taking from the center three apples each way you can practically see every apple in the box, which gives the buyer and the consumer a perfect inspection of the apples in which they are to invest their money, and satisfaction is guaranteed. This fact that the contents of the box can be so easily and so thoroughly inspected enforces honesty on the part of the grower and packer. Where the barrel encourages dishonesty and you can never expect to build up a trade on a dishonest pack, therefore, I favor the package that affords thorough inspection; the apple box. Another point in favor of the box, especially in cities, is that people living in flats with no cellar and no storage perhaps other than the kitchen or pantry, a barrel of apples would not keep well until the apples were all consumed. While with the box, only one-third of a barrel, there is no loss to the consumer which encourages the sale of more apples.

I have practiced what I have preached in the packing of apples and I have proven my argument with my trade. I sell all of our crop direct to the retail dealer, and I have never, in a single instance, heard an objection raised by commission men favoring the barrel, but we all have our opinion of commission men. I have never averaged below \$1.00 per box for No. 1's, which is an average of \$3.00 per barrel, and I question whether any other section of the state can show this average on barreled stock. In 1913 when Wisconsin apples were a drug on every market practically, we averaged \$1.14, or \$3.42 per bbl. F. O. B. our station and this year when western apples are hardly worth the freight and New York apples are worth \$1.50 per barrel for fancy, (I bought bulk New York stock at 14 cents per bushel on cars), we averaged better than \$1.00.

What is true of my district should be true of the business as a whole and I contend that an honest box pack is responsible for our success and we shall continue to use the standard box and improve upon our pack, which always has been a jumble pack and next season we shall install a grader and tier pack as

we find that in packing field run of No. 1, the larger apple makes the $2\frac{1}{2}$ look smaller and that the $2\frac{1}{2}$ inch does not in any way help the larger apples; therefore, we have decided to put in a grader and take in everything in bulk and pack it at our warehouse in boxes, and for a special trade we will use the dozen carton.

The Chairman—In closing, Mr. Palmer will have five minutes.

Mr. Palmer—I am somewhat surprised that Mr. Kern gives all the barrel men a dishonest name. I have seen a good many barrels put up that I believe were put up honestly, and we never could have built up the enormous trade in barrel apples that we have in Wisconsin by dishonest methods. I have sold my apples and sold for other people, and to the same parties as far east as the Atlantic coast, they have gone to Ohio and all over, and I have very rarely heard any complaints as to the pack of the Wisconsin apples when they were packed by people that understood how to pack barrel stock.

Our Wisconsin apples are not dishonestly packed in barrels any more than they are when they are packed in boxes. I believe that the same quality of goods put up in barrels will show as well as those in boxes. I hope to be able to hear from Mr. Kern after he takes in that beautiful crop and after he has sorted and packed his apples properly in proper boxes, not in what he calls "jumble" boxes. I would not class those as apple boxes, neither would they compare with barrel packing—that is no pack at all in my opinion. Maybe it would be all right in the local markets, but I would like to ask Mr. Kern how that pack classes in the wholesale market of Chicago or any other of the big cities. I have sold some apples in the local market in very many different ways and at different times that I did not consider packing at all. We have to pack apples in a very different way to put them on the wholesale market, and there is the test you must give the apple package.

Of course, we will have to grade carefully. As to the refrigeration, I don't see why the barrel does not offer almost absolutely perfect conditions for packing in the car. No matter how we pack, we must leave space between them for circulation. You cannot put them together in any way without leaving that space, while the box, in order to get that circulation has to be separated from the next box. So that in that part of it I do not think the barrel would be inferior in any way. Of course in Mr. Kern's locality he has what I would call a local market, and there perhaps the class of packages that he is putting up might meet with as ready a sale as any other kind. But I have taken what has always been my market, Chicago, Milwaukee and the Minneapolis market, as the criterion, and I am afraid that his "jumble" packed stock, in those markets, would hardly enter into competition with the Yakima apples.

The Chairman—Mr. Kern now has five minutes in closing this discussion.

Mr. Kern—I don't need five minutes. Mr. Palmer speaks of the "jumble" pack as if it applied only to the box. It is absolutely as safe in the box as it is in the barrel. What I was trying to do in my argument was more to get the farmer to put up an honest pack and give the retail dealer a chance to show his customer exactly what there was in the packages of apples that he sold. One gentleman raised the question that because apples were cheap any man could have bought a barrel of apples. That is quite true of the winter varieties, but never true of the fall or early varieties.

The Chairman—There is no jury except the audience. You can each decide for yourselves.

FORENOON SESSION, DECEMBER 16, 1914.

Music, Bayfield Quartette.

ANNUAL ADDRESS OF PRESIDENT.

The past year has been one of activity for the Horticultural Society of Wisconsin. The increase in our appropriation from the State was practically offset by the new ruling, which charges societies and departments with the expense of printing all documents and reports, so we had no more money for our work than before.

The advertising campaign began in 1913, has been carried on during the present season by showing Wisconsin fruit at every available opportunity. A very creditable display was made at the Apple Shippers' convention at Boston and the fruit show at our State Fair was of the usual high standard.

These displays of Wisconsin apples are always attractive, compare favorably with fruit grown in any other locality, and are bringing us recognition as a commercial fruit growing state.

The work of our Trial Orchards has been carried on with good practical results. In the orchards at Medford and Wausau, the first two orchards established, the experiment has been completed. The orchards have been abandoned, and the demonstration has been carried to new fields.

The supervision of these demonstration orchards is becoming an enormous task, requiring thousands of miles of travel, and is fast outgrowing the ability of our secretary. It will be necessary to provide him with an assistant or field man, to relieve him of at least a part of the work, or the orchards must suffer.

This matter must be considered before more orchards are established.

San Jose scale has been found in Wisconsin and also many apples affected with this disease have been shipped into the state this fall. This affords a possible means of infection and more stringent means for the control of this pest should be urged by the Society.

It would be well if a committee were appointed in conjunction with the Board of Managers to bring this matter, and also that of the weights and measures law, before the Legislature. This law providing a fifty pound bushel for apples leads to constant annoyance and trouble and should be changed.

For the present winter, a series of Horticultural Institutes has been arranged, to be held in the different fruit growing districts in the state. This is something of an experiment from which we hope the growers may derive much benefit.

In the past the efforts of the Society have been mainly to help along the lines of planting and cultivating, but we have now reached the point where packing and marketing demand our attention, and I believe it would be well to include this part of the fruit business in our demonstrations.

The market demands better quality in all lines and in planting we should bear this fact in mind and plant only fruit of the highest quality.

I should like to call the attention of the Trial Orchard Committee to the recommended fruit list of this society. We still have in that list several varieties not worthy of cultivation in Wisconsin. I hope it may be carefully revised. In the past we have been growing too much low grade fruit and this rarely brings enough in the market to cover expenses, while fruit of good quality always brings high prices.

Often there is more profit in a few barrels of fancy fruit than in a carload of medium and low grade stock. So let this society always stand for quality first.

PRUNING THE FRUIT TREE.

EMIL SAHLER, Waseca, Minn.

Pruning the fruit tree is an absolutely necessary thing to do in order to make it bear fruit. It is the key of success in growing fruit of all kinds. In my twenty-seven years of experience of growing fruits, such as apples, plums and berries, the trees I kept well pruned have brought me good results. Many people do not understand the meaning of the word pruning. Pruning means to saw off all the *unnecessary* branches and limbs, so as

to make the fruit tree bear the nice large, good fruit we are all after.

There are many reasons why the fruit tree must be pruned. Some trees need more pruning than others. If a tree is properly pruned it will bear heavily, and if not pruned it will not bear much for its owner—that is my experience with fruit trees. And if properly pruned, it will live many years longer, and the fruit will be larger and better flavored, and will also keep longer. It will hold better to the tree, and there will be a nicer color to it. The size, color, flavor, and taste is what takes with the buyer and consumer, and good sized fruit and fine color is what brings top prices and quick sales. I find in my travels that 90 per cent of fruit trees are not pruned at all or very little. I have a few apple trees that I do not prune, so as to show the people the difference between trees that are pruned and those that are not.

To make the non-bearing fruit tree bear, I saw and cut out, say, one-third to one-half of the branches, according to size and age and amount of foliage or limbs the tree has. Some trees must be heavily pruned in order to get them to bear. I take out the inside branches of the tree, say, every other one, as I see fit, so as to get the sun to shine through the branches, as the sun gives the fruit its nice color, flavor and taste. An apple off from the shady side of the tree, which gets no sunshine, will never have the flavor which the apple gets on the sunny side.

All the unnecessary branches are fruit robbers. Go after them, cut them out and grow fruit! Many trees have so few roots that all they can do is to keep alive. Take out one-half of their branches, and your tree will bear and will live two or three times as long. Also it has not got the power to force out the blossoming buds, but when the tree is properly pruned all the growth which would go into the branches, leaves, wood and bark of the branches which have been pruned out will grow into blossoming buds, and the trees will be apt to bear every year.

After I get the tree pruned I cover the place where the limb was sawed with grafting wax; in doing that the wood will not dry out so quick, and it is better for the tree. I cut limbs off close to the trunk of the tree—in cutting off close they will heal over much quicker, and it gives the tree a good appearance. Big limbs I cut from the bottom side up, say one-half inch, then I saw the remainder from the top down; in so doing it will not bark the tree, otherwise when the limb is nearly sawed off it is apt to break off and fifteen inches of bark will come off with the limb from the tree, and that of course is very harmful to the tree. My experience is that removing the branches with a saw is the best way to get them off. Sawing them off will not harm the tree, and with the saw I can get close to the trunk of the tree. My saw is two and a half inches wide and eighteen inches long. With that I can get into the tree much handier. I find by *clipping*

the branches off I cannot get close enough to the trunk of the tree; and further, I find by clipping the branches off it will bruise the bark and crack it open on the side, and it takes much longer to grow over; besides it is a setback to the tree. I find the best time to prune trees is in the last part of May or the first part of June; then the sap has set, and it will not run out from the sawed off places. The tree needs all that sap to keep it growing and healthy and to produce the blooming buds. When the fruit tree is pruned the right time of the year it will start to grow and heal over the pruned places. Many people do not cut the branches off close enough to the tree; they leave from one inch to three inches of the limb on the tree, and these nubs, or short branches, will have to rot off, and in the place where the limb was there will be an opening which the water gets into. Then the tree starts to rot, and this causes the tree to die, as it has no chance to heal and grow over. If the limb is sawed close to the trunk of the tree it will grow over, and the trunk of the tree will be smooth, and no water can get in. The grafting wax keeps the sun, wind and water out, and the tree will not be injured.

I heat the grafting wax and put it on with a small brush. When heated I can put it on much quicker and easier.

Some people do not know how to make grafting wax. This is one way of making it. Take one pound of tallow, one pint pine pitch tar, six ounces resin, one-half pint linseed oil and one pound of beeswax. Boil this mixture until all is melted and stir it well; let it cool, and it is ready to use. If it is not hard enough then add more resin to it, say two or three ounces; if it is too soft the sun is apt to melt it off from the tree wound.

After the tree has been pruned, that summer and the year following there will be sprouts or little limbs grow on the tree trunk and round the sawed off limbs; these must all be sawed off, as they are no good to the tree; being only robbers, they will take the strength away from the tree which it needs to produce the blooming buds.

I want to impress on your minds that the more brush, limbs, leaves, bark and wood your fruit trees have to grow the less fruit they will bear for you. As I said before, some trees need more pruning than others. The Peerless should be heavily pruned, and so should the Pattens Greening. I got a good crop of Peerless apples this year, and the pruning was what did it. You need not be afraid to cut off big limbs from the inside of your trees. I cut out from two to five big limbs from the middle of my trees so as to let the sun, air, wind and dew get into and on the tree and fruit, as the tree is fed and gets its nourishment from all of these things. All of these things must be taken into consideration, and if we will prune, care for and tend to our fruit trees right and give them the best of care they will bring us good results

and will bear good, nice fruit. I have shown many fruit growers how to prune their non-bearing trees, and when meeting them years afterwards they have thanked me for showing them how to make their non-bearing trees bear. I have 1,050 apple trees and over 200 plum trees, all in healthy, thrifty good shape.

A SPRAYING PROGRAM.

PROF. J. G. MOORE, Madison.

Spraying has become recognized as a necessity in orchard operations. There was a time when there was some question regarding it as essential to successful fruit growing, but that time has now passed and we no longer conduct spraying experiments for the purpose of showing that spraying is a necessary operation, but simply to teach the best methods of spraying.

Spraying improperly done is a loss of time and a waste of money; spraying which really pays must accomplish certain things to meet the needs of the orchard. We might say that the fundamentals of spraying consist in the application of materials at the proper time, the use of proper materials, and last but by no means least, thoroughness. The first two, the time of application and the materials to use, have come to be considered very largely within what we call a spraying program. The spraying program may vary as to kind of fruit, pests infesting the orchard, and the region in which the spraying is to be done. The spraying of the apple differs from the spraying of the cherry. We do not use the same materials for the control of the codling moth which we use for the control of the apple scab, and the spraying program of a northern state varies materially from that of a southern state.

Not only may the spraying program for different sections of the country differ, but we find that in a particular season it may differ for two orchards of the same section. For the most part, however, the spraying program of one orchardist in a given section will be identical with that of another orchardist. As a result we are able to outline spraying programs which apply at least for the greater part to the conditions of a given section.

If I were to define what is the best spraying program, I should say that it is that spraying program which most effectually controls the pest which we are combating, and does the least injury to the fruit and to the plant. These two things, at least, must be considered in any case, for we might outline a program which would control the pest successfully and which would injure the fruit or the tree materially. On the other hand, we might outline a program which would not injure the tree or the fruit, and at

the same time be useless so far as the control of the pest is concerned.

Spraying programs change frequently. The reasons why they change is because each succeeding year finds some new spraying material on the market, some material which is supposed to be better than anything we have had in the past to perform a certain function in the control of pests. If you read a spraying program published two years ago and one published at the present time, you find certain materials recommended now which were not recommended then, which in fact, possibly were unheard of as spraying materials two years ago. Another factor which enters into the reason for a changed spraying program is that from year to year as investigations and observations are carried on, we come to know better the life histories or habits of the pests which we are to combat, and when we find out something new about an insect or a fungous disease, we very frequently find that upon that data we may change our spraying program so that it will be more effective than it was before.

I would like to have it understood to-day that in the spraying program which I shall outline I am not giving spraying programs which are necessarily going to be operative five years hence. In fact, I will not say that they will be operative two years hence, for no one can predict just what new phase of spraying may come up, what new material may be discovered, or be brought into utilization as a spraying material, or what new thing may be found out concerning certain pests which may materially change the recommendations which I make to-day.

As I have indicated, it is not possible to make a recommendation or lay down a spraying program which will apply to all fruits. Therefore in making these recommendations for Wisconsin to-day, I shall take up briefly spraying programs for the various important fruits.

THE APPLE.

We find that in Wisconsin the most important pests of the apple are scab, codling moth, curculio, aphid, oyster shell scale and fire blight. I have not, by any means, covered the entire list. I have simply given you the ones which we most frequently meet and have to control. You cannot control the blight by spraying, and we will eliminate that from our consideration. Oyster shell scale can be controlled by spraying with lime sulphur at 1.03 during the dormant period. This pest does not demand attention each season and need not be considered further in an annual spraying program.

Fortunately in spraying we are frequently able to combine those materials which are used to control insects and disease. For the pests of the apple which I have named and for some others which I have not named, the following is a general spraying program under Wisconsin conditions.

The first application will be made when the blossoms begin to show pink. That is, after the mixed buds in which the flowers are contained are opened somewhat, and after the flower buds within these mixed buds have begun to develop so we begin to get color. At this time we may use Bordeaux mixture, prepared after one of the various formulae. I would suggest the 4-4-50 formula, although others may be and probably are just as good. Or we may use lime sulphur at the summer strength.

The only satisfactory method at present of determining the strength of lime sulphur and the amount of water which must be added to it in order to give us a spray of the proper dilution, is to determine the specific gravity of the material. Lime sulphur which shows a specific gravity after dilution of 1.01 to 1.0075 is best for summer spraying. The amount of water which will need to be added to the commercial product will, therefore, depend upon the strength of the latter. This necessitates for accurate work the use of the hydrometer, when lime sulphur is to be used as a spray, as the commercial brands of lime sulphur vary considerably. If the concentrated lime sulphur has a specific gravity of 1.30, the amount of dilution may be determined by dividing the decimal .30 by the decimal of the strength of the spray desired, in this case by .01 or .0075, which gives the rate of dilution. If the strength of the spray is to be 1.01, then the result would be 30 and therefore to 1 gallon of the concentrate we should add 30 gallons of water.

Arsenate of lead should be added to the fungicide at the rate of about two to two and a half pounds of paste per fifty gallons, or about half this amount if powdered arsenate is used.

The second application in the spraying program for the apple orchard, and by far the most important application, is the one which should follow the falling of the petals. This application should be made within a period of about three to ten days following the falling of the petals. The exact time, if you are very particular in making this application, may be determined by observing the rapidity with which the calyx lobes close after the petals have fallen. To be effective, the spray must be applied before the lobes close. There is a difference in varieties regarding this, and if you have extensive orchards, it will pay you to determine more accurately when the application should be made than it is possible to indicate in a general way. The pest we are most anxious to control by this application is the codling moth, although the control of apple scab is important at this time. We will use for this application lime sulphur at the same rate of dilution which I mentioned before, and to it we will add arsenate of lead in the same amounts as in the first application.

The question may arise, Why do you say lime sulphur definitely in this case instead of saying either lime sulphur or Bordeaux mixture? Because we are looking for a program which will best

control the pest and do the least injury, and we believe if we use lime sulphur for this application, we will avoid most of the Bordeaux injury, which is the chief disadvantage in the use of Bordeaux, even though Bordeaux is used for all the other applications.

A third application, using the same materials as in the first, is made about two weeks after the calyx spraying, the second application which I have mentioned. A fourth application should be made on the later maturing fruit sometime during the latter part of July. Definite dates cannot be given for this, because the life history of the codling moth has not been worked out in sufficient detail to indicate the exact dates at which the second brood emerges. This occurs, however, sometime during the latter part of July. The spray material should be lime sulphur or Bordeaux mixture and arsenate of lead.

CHERRIES.

The spraying program for the cherry is similar to that of the apple orchard. The diseases which are most troublesome are shot-hole fungus and the brown rot, and of the insects the curculio and the cherry slug require most attention. We believe that Bordeaux mixture is a more efficient spray material for the cherry than is lime sulphur, and therefore, I recommend the use of Bordeaux mixture on the cherry. To the Bordeaux mixture will be added arsenate of lead in the same proportion previously mentioned.

The first application may be made about the time the flower buds are beginning to swell. There is some question at present as to the necessity for this application. We do not know definitely whether it could be omitted and as good results attained, or whether it is essential. This question is now under investigation. Meanwhile it is probably best to include this application in the spraying program.

The second application should be made within ten days after the petals fall, and the materials should be the same as previously noted. Follow in two weeks with a similar application, and then as soon as the crop is harvested, put on another application of the same materials. This is the most efficient spraying program which we know of at the present time for Wisconsin cherries.

THE PLUM.

The plum is not so important, of course, as either of the other two fruits mentioned; neither is the spraying program so well worked out. The troubles which will give us the most concern ordinarily will be the brown rot, which may affect either the twigs, flowers, or fruit, and the curculio, which attacks the fruit. We are not certain concerning the application of sprays in the dormant period for the brown rot. The indications are that it is

not effective, and that the most efficient control measure during the dormant period is in orchard sanitation, getting rid of the mummified fruits on the tree and the fallen fruits under the tree, either by picking them up, or plowing them under. Spraying will usually begin after the petals have fallen and may be either lime sulphur or Bordeaux mixture plus arsenate of lead at the same rates as mentioned previously. This application will be followed by two or three other applications, using the same materials at intervals of about two to three weeks. The second application should be put on about two weeks after the first.

The aphid which I did not mention, attacks the cherry and the plum as well as the apple. The aphid usually appears just about the time the buds begin to show the least bit of green and if they are present in considerable numbers, the buds will be entirely covered with them. This seems to be the most satisfactory time for the control of this pest. Probably the most effective sprays are lime sulphur at the winter strength of 1.03, or some tobacco decoction or extract, which can be secured upon the market and should be diluted according to directions.

There are spraying programs for the small fruits, but as I have already exceeded the time allotted me, their consideration will have to be left until some future time.

SPRAYING MACHINERY.

GEORGE F. POTTER.

Upon the efficiency of the spraying machinery depend the ease and convenience of the spraying operation, and further, its rapidity and thoroughness. Since spraying is a loss of time and money unless it is thoroughly done at the proper time, the possession of an adequate spraying outfit is necessary for the production of first-class fruit.

A manufacturer of spray materials has very aptly likened a well sprayed tree to a pane of window glass at the beginning of a shower. Everyone knows that when a rain begins, drops collect upon the window and so long as they do not touch each other a large quantity of water adheres to the pane. When enough drops accumulate so that they run together a large portion of the water drains off. Our spraying operations should be such as to cover the tree with a multitude of fine drops. The finer and more numerous the drops the more efficient is the application. The means usually used to accomplish this end is to place the spray liquid under pressure with a force pump and to break it into a fine mist by discharging through a specially designed nozzle. Hose and extension rods are necessary to direct the spray over

the entire tree. The essentials of the outfit then are (1) a force pump, (2) hose, (3) extension rod, and (4) nozzles.

The catalogues of present day manufacturers of spraying machinery advertise many different types of pumps for special purposes. Those which are used for orchard spraying may be classified according to their capacity and as to whether the power is supplied by a man or by mechanical means. Hand atomizers and knapsack sprayers should not be considered for use in an orchard unless possibly for the application of small amounts of material to newly set trees. The bucket pump is a small force pump designed, as its name indicates, to be used with a bucket full of material, and may possibly be used for spraying a tree or two; but for ordinary orchard operations it is impractical. The next larger type of pump ordinarily manufactured is the barrel pump, primarily designed to be attached to a barrel and made in small and large sizes. These outfits are capable of supplying one lead of hose and one nozzle, and are suitable, therefore, for spraying small farm orchards, where the trees are not too large, and possibly larger areas of small trees. The smaller ones may be used as bucket pumps and serve many purposes on a general farm. The larger ones maintain better pressure for extensive orchards. Hand lever pumps, having larger cylinders and greater capacity than the barrel pump, are designed to supply one or two leads of hose. In actual practice, however, it is very difficult for one man to maintain a satisfactory pressure with more than one lead of hose, even with such an outfit. With the better pump of this type a pressure of seventy-five to a hundred pounds to the square inch may be maintained while supplying two large spray nozzles, and in consequence such an outfit will spray more rapidly and may be used profitably for correspondingly larger orchards, possibly up to three or four acres of trees. Among power pumps or those operated by mechanical means we find gas, compressed air, traction, and gasoline engine driven machines. The gasoline driven outfit practically supersedes all other sorts and will be the only one considered here. The saving of labor and greater speed and efficiency of operation make it profitable to use these machines on plantations of five to twenty acres of large trees.

Whatever the type of pump, certain elements in its construction are essential. These are strength and lightness of construction, simplicity of design, and ease of access at the working parts. All the working parts in contact with the spray, particularly the pump cylinder and the valves, must be made of material which will not be corroded. An air chamber or pressure chamber of sufficient size to insure a steady flow of liquid to the nozzles must be furnished. The size of the air chamber necessarily will vary with the type of pump and the amount of liquid discharged per minute. Provision for agitating the spray liquid is of great importance, for our materials are constantly settling to the bottom

of the tank, and if we are to apply them uniformly to our trees, it is necessary to keep them stirred.

The valves are the heart of the pump. Since they are alike in practically all sprayers, we will take up a discussion of them here with our general considerations. Two kinds are in general use; the ball valve, and what is known as the poppet valve. In the first of these the valve is a large bronze ball resting upon a circular valve seat, and as the bronze ball may be turned completely over in any direction as it works, this type of valve is generally conceded to wear most evenly and to be the most satisfactory. In the poppet type of valve we have a flat disk fitting down over a circular opening. As this can turn only on one axis, it does not usually wear quite so evenly. Its efficiency depends largely upon the manner in which the moving part of the valve is guided as it rises and falls. What is known as the wing type of guide is certainly the most satisfactory with this valve. Accessibility of parts has been already mentioned, but it is of such extreme importance with valves that it must again be emphasized here. Particles in the spray mixture are exceedingly likely to stick in the valves and necessitate cleaning them at any time during the spraying.

In hand pumps the one most essential consideration is ease of operation. This is accomplished through simplicity of operation of levers, and the reduction to a minimum of friction in the cylinders and packing. A common impression given by spray manufacturers in their catalogues is that the longer or the greater the leverage which one has in operating the pump, the easier it is to maintain the pressure. It is indeed true that the longer the lever, the easier it is to move, but at the same time, it is true that the longer the lever, the farther it has to be moved, and the total amount of work done is equal in any case. The leverage, then should be such that the man working the pump can apply his strength to the greatest advantage. Provision for adjusting leverage is a good feature. The reduction of friction in the bearings of the lever is a very important point to consider.

A few of the most essential points in regard to the barrel pump must be mentioned here. In some pumps the cylinder is placed at the top of the barrel, and in the others it is submerged, being located near the bottom. I think it is safe to say that the latter is the more satisfactory. Again, we find barrel pumps divided into those pumps which are mounted on the end of the barrel and those which are mounted upon the side. When the pump is mounted in the end of the barrel, it is generally more convenient to operate. The other type, however, will empty the barrel more completely, is lower for driving under branches, and possibly affords better agitation. The air chamber of the barrel pump should be relatively large in size, a good rule being that the capacity of the air chamber in gallons be twice the number

of gallons delivered per minute by the pump under ordinary operations.

Little further than the general principles already laid down need be said in connection with the hand lever outfits. The tendency among the better spray manufacturers of late has been to build a pump having two vertical single-acting cylinders in place of the older type which had one double-acting horizontal cylinder. Because of the packing about the piston in the double-acting cylinder type, it is probable that there is more friction with such a pump. The cost of construction of the two-cylinder pump is slightly more—possibly four or five dollars,—but my experience would lead me to believe that the increased ease of operation and ease of access at the packing make it worth the difference in price. The provision most frequently neglected with the hand lever outfit is that of agitation. This is a point which must be considered carefully, therefore, in selecting an outfit.

When we reach the consideration of power pumps, the capacity of the pump is again an important question. Different sizes are manufactured, ranging from the one-man outfits, delivering possibly two gallons per minute, to the four-cylinder pumps driven by four-horse power engines, and delivering twelve or more gallons per minute. The weight of the outfit should be directly related to its capacity, and should be as light as is consistent with the work done. Compactness and strength of construction are particularly important with the power machine. Rigidity of the frame is absolutely essential. Several means are used by different companies in attaining this rigidity. One of the best of these is the manufacture of a pump and engine all upon one metal base. Steel I-beams as a framework of the sprayer also give very satisfactory results.

The ease of handling a power sprayer is another point worthy of consideration. Since turning in small spaces and backing into difficult places is often necessary, it is an advantage to have the sprayer which is undercut so that the front wheels may be turned at right angles to the body of the sprayer. Another machine is built upon the orchard wagon principle, in which both the front and rear axles are movable, and are connected by levers such that if the front axle is turned in one direction, the back axle makes a corresponding turn in the opposite direction. This facilitates turning and makes it impossible to catch the rear trucks upon trees or other obstructions, as they follow absolutely in the track of the front wheels.

The engine, our source of power, is one of the most important units of the outfit. The four cycle engine is usually to be preferred. This is a general rule applying to all farm engines, and the spray engine is no exception. The demands of the fruit grower are for an engine which shall be light, powerful, and durable. It is only possible to develop high power in a light engine

by a high speed of revolution, and this is fatal to durability. We must therefore strike an average between the heavy slow engine and the light high speed motor. An engine constructed to run under high compression and at the speed of 450 to 500 revolutions a minute gives good satisfaction.

In an engine used upon a sprayer passing over rough ground, it is sometimes difficult to obtain the best mixture of air and gasoline. Two types of "mixers" or carburetors are commonly found on spray engines. In one of these the gasoline is drawn up to the carburetor by suction; in the other it is forced by a mechanically operated gasoline pump. Where the gasoline is drawn by suction the distance which it must be sucked up to the carburetor will vary whenever the level of the engine changes, and consequently the richness of the mixture will be changed. I have tried to use power sprayers in which the difficulty due to this cause made the machine practically worthless in a hilly orchard. In other suction fed engines the trouble is not so serious, but in the engine in which the gasoline is fed by a pump as mentioned before, it is entirely obviated.

The manner of connecting the pump to the engine is a subject open to much discussion. The two most common means are by gearing and by a belt. My observations have led me to believe that either system, if well-designed, will be satisfactory. However, if the frame of a gear-connected pump or spray outfit is not absolutely rigid, the gears are almost certain to be broken, causing corresponding delays and trouble. If the belt of a belt-driven machine is not properly equipped with tension tighteners, it is likely to give trouble by slipping. It is possible that the belt-driven machine needs slightly more attention, as the belt must be removed at the conclusion of any piece of spraying to prevent undue stretching.

In power pumps, as in hand outfits, the tendency is away from the double-acting cylinder towards a larger number of single-acting cylinders. The usual number is two in a smaller machine and three in the larger ones. The cylinders of the pump must be constructed of material which will not be corroded by the spray. Brass is most commonly used, and gives complete satisfaction. Some manufacturers, however, prefer to use cylinders lined with porcelain, and these pumps also give perfect satisfaction. The guiding and the alignment of the piston or plunger operated within the cylinder is important. The means in most common use by present day manufacturers is to use a plunger cup which is to be practically as long as a cylinder and which because of its length of contact, guides itself. Such plunger cups are operated by connecting rods from eccentrics or crank shafts above.

The type of packing which is at present most popular is the cup-shaped packing fastened at the bottom of the plunger. This

is expanded against the sides of the cylinder to a large extent by the pressure of the liquid against which it is operating, and consequently on the return stroke gives little or no friction. Outside packing tightened around the plungers in glands at the top of the cylinder is still used by some manufacturers, and practically all of those who use the cup packing just described also retain the outside packing for lubrication purposes.

Before leaving the discussion of the power pump, the subject of valves should be mentioned again. Attention has already been called to the necessity of having the valves easy of access. It is triply necessary in power outfits because with three or four cylinders operating, we have six or eight different valves, and it is practically impossible, when trouble occurs, to tell in which one it is located. This may necessitate, then, the removal of all the valves, and hence the extreme importance of ease of access is evident. Especially designed wrenches for getting into inconvenient places are made by many manufacturers, and render their otherwise inaccessible valves fairly convenient.

The agitation on modern power sprayers is practically always furnished by revolving propellers. For best results the shaft carrying these propellers should operate at about one hundred revolutions per minute.

With the power pump some means must be provided to care for the excess of pressure if the machine supplies more liquid than is needed at the nozzles. This was formerly universally accomplished by placing a relief or sort of safety valve in the circuit which allowed the excess pressure to escape back into the tank.

It is obvious that the engine and pump must work under full load whether or not the nozzles are being used. Recently, therefore, several companies have fitted their machines with automatic pressure regulators, by which when a certain pressure is reached in the air chamber, the liquid flowing from the pump is diverted from its regular path through a by-path back into the tank. It meets no resistance flowing into the tank, and consequently when the by-path is opened, there is no strain upon the working parts of the machine, and a large part of the engine fuel is saved. The advantages of such pressure regulation are obvious, and all that we need to ask of the spray manufacturer is that his regulator be reliable in its action. Not all of our standard sprayers are yet equipped with these regulators, and it is certainly better to use the old relief valves, than to have an unreliable regulator. There should be nothing about the regulator than can possibly bind and retard its action.

Before concluding, it will be necessary to mention briefly a few points in regard to the accessories of the spray outfit. The hose must be that manufactured primarily for spraying. No ordinary hose is able to withstand the tremendous pressures developed. The size usually used is the $\frac{1}{2}$ or $\frac{3}{8}$ " hose. Many

manufacturers, in their endeavors to produce a low-priced barrel sprayer, equip it with such a short length of hose that it is impracticable to use it. Fifteen feet is absolutely necessary for good work, and twenty-five feet is to be preferred. The hose couplings and clamps often give trouble through "blowing out" under high pressure. The couplings then should have a long shank with space upon it for tightening two or three ordinary hose clamps of the Sherman type. Certain companies are now making a clamp tightened on with small bolts which connect with the shank of the coupling in notches, and render it absolutely impossible for the connection to blow out.

The extension rods may be either of iron or bamboo. The iron rods are simply pieces of quarter-inch pipe, eight, or possibly ten, feet in length. The chief advantage is that they are inexpensive. They bend and rust, and will stain the hands of the operator. The better rods are constructed with a light brass tube inside of a bamboo pole. These are more durable, may be made in longer lengths, and are much more convenient to use. The price, however, is relatively higher.

Space does not permit of a thorough discussion of nozzles. Three distinct types are found upon the market,—those which are known as Bordeaux, Vermorel and Disc nozzles. The latter type is the most popular. Whatever the nozzle, it should be connected to the extension rod at an angle so that the spray is not directed straight along the direction of the rod, but rather to one side. The spraying may be much more easily and conveniently done if nozzles are attached in this way. Two nozzles are usually used on each pole. Two straight nozzles may be connected on an angle Y or two angle nozzles on a straight Y. If the angle nozzles and straight Y are used, the angle between the two sprays may be adjusted, which is an advantage, for the best angle varies according to the kind of nozzle used or even according to the pressure at which the spraying is done.

A spraying outfit, like the proverbial "one horse shay" should be of the best quality in every one of its parts. When the engine carries the load with rhythmic puffs, the pump works smoothly, the pressure guage needle hovers around 250 pounds, there are no leaks in the hose, and the nozzles sing as the spray shoots out, then spraying is not despised drudgery, but rather a pleasure.

FUNGOUS TROUBLES.

PROF. L. R. JONES, Madison.

I expected to have the opportunity to show some lantern slides this afternoon and not having that opportunity, I will give you my message in a very few words. In the program this afternoon we have had emphasis thrown upon the possibilities of spraying

in order to control fungous diseases, and of course that is the most important. The particular idea, however, I wish to bring out, after the experience of one year more in looking after plant diseases and their control, is that there are other things aside from spraying which we need to stress.

One is the importance of keeping these things out. The Government is taking a strong leadership in this way. One year ago a conference was called in Washington with reference to the danger from certain European potato diseases. Evidence was presented which showed that the diseases that were being brought in were threatening to ruin our own potato industry. The result was that the United States Government decided to control absolutely the importation of any further potatoes from Europe or Canada. Today we are importing potatoes only from certain limited sections in Canada and Europe where they can give absolutely clean bills of health. This is one of the most wholesome stands this government has ever taken, since it establishes clearly the principle of national quarantine.

This same action has also been applied to certain kinds of nursery stock; certain evergreen trees cannot be imported today, because of the diseases coming with them. This is a thing of very great importance for the protection of the future forests of America.

We wish to urge this Society whenever there is an opportunity to continue to use its influence favoring even more far-reaching quarantine measures. I believe we are tending toward the decision on the part of our government that the nurserymen of this country should not import plants for propagation, unless it be the very limited number of kinds which we cannot produce. This United States, with our great area of diversified territory, has no business, in my opinion, to go to Europe, Japan and other countries, and without any proper supervision import all sorts of things and thus subject our own crops to the danger of new pests.

Nor is it alone this question of foreign countries. Within our own borders we are in danger of not being careful enough about what we bring in. Some of you have raised the question of the black knot disease of the plum and cherry. In the East it is one of the most destructive troubles they have to combat. In parts of the Hudson Valley it has driven plum culture out. Here it is practically unknown on the cultivated plum farm. Now, why is that? We have this disease everywhere common on the wild choke cherry, and it occurs on other wild cherries, but our studies at the University are leading us toward the conclusion that the black knot upon our wild cherries does not spread to the cultivated cherry or plum. If this proves to be true, there is little danger of black knot coming into our Wisconsin orchards unless we bring it in upon nursery trees. It has appeared upon such Eastern stock in some cases which have recently come to our

attention. These were promptly destroyed, but continued vigilance must be exercised if all these are to be excluded.

Similar warning should be made with reference to the alfalfa gall disease. This is, perhaps, the most serious disease of alfalfa known. It has recently appeared at several points in the western United States, apparently introduced with European seed. If it is being so carried from place to place on seed we would seem almost powerless to guard against its gradual spread to all parts of the country unless the U. S. Government locate the diseased areas and guard against the export of seed from them.

Another thing relates to the potato disease known as the late blight, which this year caused large loss in northern Wisconsin. Here we have a disease which is already in the state, but fortunately it is not distributed widely in our fields at present. It should be emphasized therefore, that according to our best information, the germs of late blight do not persist in the soil, but the disease is carried over winter only in the seed.

Finally the thing that I would emphasize is that we should pay more attention than we have done to the selection of varieties of plants that are disease-resisting. Had the lantern been available, I planned to show you the results gained in attacking one particular disease in this way, namely the cabbage. As it is, I will not go into details, but simply point to the general problem and the method outlined for its solution. Some years ago a cabbage disease appeared in the intensive cabbage growing district of southeastern Wisconsin which threatened to destroy the industry. Various methods of control, involving the use of seed or soil treatment, fertilization and rotation all proved ineffective. What then should be done? There was absolutely no suggestion to be made except to work along the line of resistant varieties. Trials of the commercial varieties showed that some were more resistant than others, but, unfortunately, none of the first quality was highly resistant. The problem then was to secure a resistant strain of the best commercial type. With this idea we began in 1910 by going through badly diseased fields of such cabbage and selecting certain plants that had remained healthy in spite of the surrounding conditions. From these in 1911 we grew seed and in 1912 put this back for trial on the same "cabbage sick" ground. Repeating the process of selection we have now head selections of the third generation. The results are consistent and convincing. In 1910 the commercial crop was 95 per cent failure on the field where we began work. The soil was thoroughly infested or "cabbage sick." We have, however, been growing cabbages on the same soil every year since, the fifth successive crop on the same soil. In 1910 as stated above the cabbage was a commercial failure; in 1914 we had on this field a perfect stand from the selected seed. Now what has been done with the cabbage, in my judgment, can in some measure be done with various other crops. While this in

most cases will prove slower work than it has with the cabbage, it is important to emphasize its ultimate value. Plant diseases, in general, are bound to increase, and in the long run it is going to become a matter of great importance in all lines of plant culture to give increasing attention to the selection and breeding of cultivated plants of all kinds in order to secure strains better adapted to local conditions and especially resistant to local diseases.

DISCUSSION.

Member. Why is it that about ten years ago we had serious trouble with late blight? We didn't then know much about how these diseases lived over from year to year, and there was very little care taken to check the disease, so I don't see, when everybody planted their seed regardless of the crop that it came from, why we didn't have more blight.

Prof. Jones. We are fortunate in Wisconsin that our climatic conditions are such that it is not often that we have conditions favorable to the development of the late blight. For the last three years blight has been present in some sections of northern Wisconsin. This last year we had conditions which were peculiarly favorable for the disease, therefore it was bad. It depends, primarily, upon the climatic conditions as to how rapidly the disease spreads after it is introduced. Let us hope that conditions do not favor it next year, when it will again disappear as it did ten years ago.

A Member. I bought certified seed from a party who had the tops of his potatoes killed by the frost before the blight struck and we supposed it was perfectly safe.

Prof. Jones. You were in luck. It would have saved a great deal of this trouble if we had more early frost in northern Wisconsin.

FIRE BLIGHT.

R. E. VAUGHAN,

Department of Plant Pathology, University of Wisconsin.

Fire blight, although a timeworn subject, is one of vital importance to every Wisconsin orchardist, as it is one of the most common and serious of our orchard diseases. It affects principally, as you know, apples, pears, and quinces, but may also occur on Siberian crab, all species of wild apple, service berry, mountain ash, and sometimes on plum, red raspberry, and blackberry. All parts of the tree may be affected, including the blossoms, fruit,

twigs, branches, trunks and roots. It is most common on the blossoms and twigs, but does a vast amount of damage on the trunks where cankers are formed and in the roots which are blackened and decayed.

Wisconsin is not alone in suffering from this trouble. Reports from our neighboring state of Illinois show that fire blight has caused an unusual amount of loss to the orchardists of that state during the past summer, estimated by Prof. Picket of the University of Illinois to be over \$1,500,000. Furthermore the western apple producing states of Montana, Washington and Oregon are spending large sums in orchard inspection, one of the chief objects of which is the eradication of the blight. And an observational trip through that country this past season was sufficient to show that they were succeeding to a marked degree.

The western orchardists are employing persistent and systematic pruning of blighted trees over large areas; hold-over cankers are cut out and the wound disinfected, or if too bad the tree is removed altogether. Trained inspectors go through the orchards, examining both sides of the trees and removing any blighted twig as soon as it is seen. The use of bridge grafting was one of the methods employed where the trunk wounds were too large to heal naturally. This was strikingly shown at the Hillside Orchard, Medford, Oregon. However, when the blight was found to have invaded the roots, the only remedy was to remove the whole tree at once.

In the Bitter Root Valley of Montana, the orchardists were not as successful in the control of the blight as in the Rogue River or Hood River sections. This seemed to be largely due to a lack of community effort in working together for the common good. The larger growers were of the opinion that it was no use for them to destroy blighted trees because the smaller and less progressive growers would allow sources of infection to remain in active condition. On the other hand, the smaller growers were holding back waiting for the others to take the lead.

An easy method for the control of fire blight has not yet been discovered, and until then eternal vigilance in the cutting out of diseased trees or parts of trees, is the price of success. One man or one company will have little hope of succeeding alone, but by concerted effort on the part of growers in isolated sections or states much may be accomplished.

SUMMARY.

Fire blight can be held in check by:

1. Removing hold-over blights from orchard and other trees in the fall or early spring before growth starts.
2. Frequent and systematic inspections throughout the growing season when all infections are cut out and burned.

3. Eradication of aphids, tarnished plant bugs and other sucking or boring insects which carry the blight from diseased to healthy trees.

4. Coöperation and community effort over extended sections are necessary for success.

WHAT OUR GOVERNMENT IS DOING FOR THE CONTROL OF INSECTS.

J. G. SANDERS.

It seems wise at this time to depart from the customary phases of the topic of control of insects, as designated in our program for this meeting, and it seems advisable to call the attention of our horticulturists to the large and comprehensive works of our entomologists under federal and state control, and to outline briefly the various phases of activity which are demanding their efforts.

SCOPE OF ENTOMOLOGY.

The study of insects is such a broad and intricate question, including so many phases of agriculture and vocational pursuits, that unless attention is called to it the average person fails to comprehend the problems confronting the Entomologist. For this reason it seems desirable to review briefly the various efforts at insect control which are being carried on by our United States government, and in some cases along similar lines by the several states, particularly in those states where entomological departments have been at work for a long series of years and where a considerable system has been developed.

Under the U. S. Department of Agriculture there is included a Bureau of Entomology with Dr. L. O. Howard as Chief Entomologist and several entomologists immediately under his direction and in charge of divisions of work who in turn are in charge of large corps of assistants. As we proceed with the discussion, these divisions will be designated.

GIPSY AND BROWN-TAIL MOTHS.

As most of you know, a number of years ago these two very serious pests were introduced into Massachusetts, presumably, on nursery stock, and in spite of all the efforts of the entomologists a gradual spread has occurred, although greatly restricted by control measures advocated by the Entomologist, until practically all of New England is infested by the Brown-tail moth and a much smaller area by the Gipsy moth. Approximately one million dollars is being spent each year for the control of these pests by the U. S. Government and various New England states and private

owners. A quarantine has been established by the government over the known infested areas prohibiting the shipment of certain classes of materials from this district unless inspected and passed.

A considerable portion of the control measures have been directed to the introduction of the natural parasites and enemies of these two European moths and with satisfactory results which may prove ultimately to be complete controls.

At the present time your Entomologist and assistants are inspecting all importations of foreign plant material, hoping thereby to prevent the possible introduction of these two pests or other serious pests into Wisconsin. Approximately four hundred thousand trees and shrubs were inspected during the past year, thus adding a very great deal to the duties of our department.

DECIDUOUS FRUIT INSECT INVESTIGATIONS.

Under this branch of the insect work of the government, investigations are being carried on concerning insects affecting apple, peach, plum, cherry, pear, grapevines, and nut bearing trees and cranberries.

In addition, this division is studying the application of insecticides of various kinds and the use of spray machinery in their application.

Some very careful studies have been made of the codling moth, the plum curculio, the grape root worm, the pear thrips, the grape *Phylloxera*, and the various species of aphids which affect fruits, and new sprays and control methods have been worked out and are now advised for treatment. There is no doubt but that the investigations along this line have resulted in the saving of many thousands of dollars to the fruit growers of the country, and from this most thorough work carried on by the government, the various state entomologists can secure valuable information.

SOUTHERN FIELD CROP INSECT INVESTIGATIONS.

This branch of the work, which has used a large amount of money, is concerned principally with the control of the cotton-boll weevil, and other cotton insects; also, insects affecting tobacco, sugar cane and rice. There is little done by this division which appeals to the Northern states excepting a certain amount of work on the tobacco insects.

INSECTS AFFECTING THE HEALTH OF MAN AND ANIMALS.

This new division of the work has taken up the study of several of the more serious insects which carry or transmit diseases to man and animals, and particular attention has been paid to the control of the malaria mosquito, the house fly, and the Rocky Mountain tick which disseminates spotted fever in the vicinity of the Bitter Root Valley, Montana. Also, the study of flies which attack domestic animals, including the horn fly and the various

species of bot flies, has been conducted in conjunction with studies of the species of cattle ticks which are known to disseminate Texas fever in the South.

CEREAL AND FORAGE INSECT INVESTIGATIONS.

Under this group of studies have been included such pests of national reputation as the alfalfa weevil, grasshoppers, army worms, white grubs and Hessian flies, along with other species of lesser importance. Most satisfactory results have been obtained in the work of this section as carried on in nine sub-stations located throughout the United States, and the money spent in this work is repaid manyfold to the farming communities.

INSECTS INJURING FORESTS.

The millions of dollars lost in damage of insects to forest products has received attention from a number of experts, and methods of prevention and control have been worked out in many instances which have resulted in the preservation of large and valuable forest ranges, particularly in the western country. This particular line of work has recently received great impetus through the awakening of the people to the importance of saving our forests and forest products.

INSECTS INJURIOUS TO VEGETABLE AND TRUCK CROPS.

Some valuable work has been done with reference to the control of insects affecting truck crops, particularly those affecting sugar beets, cabbage, onions and potatoes and various other lesser crops. It is probable that in the aggregate, no greater losses are sustained on any class of products than occur in the vegetable and truck crops, which are found in almost every garden as well as in the larger commercial plantings. The annual losses run well into the millions.

INSECTS AFFECTING STORED PRODUCTS.

Cereals, dried fruits, grains and fabrics are injured to a remarkable extent by certain classes of usually small insects, entailing in the aggregate millions of dollars loss. Various methods, including fumigation with various gases and sterilization by heat, have been devised for the satisfactory control of many of these pests. Yet, much remains to be determined along certain lines.

INSECTS AFFECTING TROPICAL FRUITS.

This branch of the work is separated from the deciduous fruit investigations and includes those insects affecting principally the citrus fruits and other tropical types, including date palms, olives, etc. Various methods for the fumigation of the entire

orange or lemon tree with poisonous cyanide gas, have been worked out and the proper dosage to be used under tents over the trees has been determined with accuracy.

A strict quarantine has been placed over certain fruits from Mexico and from Hawaii, hoping thereby to prevent the introduction of several serious insect pests.

WORK IN BEEKEEPING.

For a number of years an expert has been in charge of this work under the government, and some new and interesting methods of control and handling of bees, as well as methods of eradication of bee diseases, have been worked out. Studies have been made of the best methods of wintering bees and feeding for fall and spring conditions. Particular attention has been given to the two serious bee diseases known as European Foul Brood and American Foul Brood, both diseases which have been widely scattered over the United States and have reduced the numbers of colonies of bees developed during the past decade. Fortunately, in Wisconsin we have had a very careful inspection of apiaries under the State Apiary Inspector, Mr. N. E. France of Platteville, and we have consequently less bee disease within our state than is found in our neighboring states.

The effect on bees of spraying fruit trees while in bloom is being determined by this division, and we hope at some future time to report scientific results on this question.

It has seemed desirable to call the attention of the members of the Horticultural Society to these many varied lines of work carried on by the U. S. government, with a view to pointing out the necessities for an increase in the work which we should have in this state, and also to call the attention of the members to the fact that there are many insect problems which are of tremendous importance to Agriculture and the Arts.

It has been estimated that the annual loss from insect attacks in the United States aggregates nearly two billion dollars, a considerable proportion of which loss could well be eliminated by a more thorough understanding of insects and their habits, and methods for control.

Does it not seem advisable that greater attention should be given in our public schools and in our colleges and universities to these most important problems which are growing more and more important each year as new pests are being introduced and disseminated through the various channels of travel? It seems that we might well eliminate or curtail some of the old-fashioned instruction in the dead languages and much of the required work in some of the modern languages and in the higher mathematics, and include subjects concerning animals and plants with which we come in almost daily contact through our entire lives.

THE CRANBERRY FROM THE PRODUCER TO THE RETAILER.

O. G. MALDE.

Cranberry harvest season in Wisconsin lasts from about September 5 to October 1, unless there is an unusual amount of wet weather during this period. Large crowds of harvesters, both Indian and white, gather on the bogs for the harvest, where the men are hired to use the cranberry rakes or scoops, and the women and young people to do hand picking.

The wages of the rakers range from \$3.00 a day and board down on a ratio estimated by each man's daily harvest as compared with the best man's record. The hand picking is done by the bushel, and sixty cents is about the average price paid.

The rakers usually spend an hour or an hour and a half in the morning pulling weeds until the fruit is dry before commencing harvesting. In order that all fruit may be uniformly dry the hand pickers remain in their cottages until the dew is off.

The fruit is brought into the warehouses and stored in flat bushel crates to cure up and take on more color, and to wait the demand for the packing, which is about the tenth of October, except when weather remains unseasonably warm so other fresh fruits and vegetables remain late upon the market, when the demand for cranberries is retarded ten to twenty days.

By marketing through the Wisconsin Cranberry Sales Company the growers have their crops inspected and are instructed in grading and cleaning the crop for shipment as orders are received, at which time cars ordered for the shipments are placed on the nearest railroad side tracks for them. Early shipments are made in the common vegetable car or in un-iced refrigerator cars.

The grower commonly gets \$6.50 per barrel for the common natives, and \$1.00 to \$2.00 more for the improved varieties that run larger or are late keepers. This year, however, the common natives are as low as \$4.50 to \$5.00 per barrel.

The prevailing retail price is ten, twelve and a half and fifteen cents per pound, according to grade and variety, but such retail prices are unwarranted in a year of low wholesale prices.

It is at the hands of the retailer that cranberries, as well as some other fruits receive a decided setback in their ability to hold up, as we call it, or to keep well. A large number of the retailers make a practice of setting cranberries or apples out on the sidewalk during the daytime, and then moving them into the store within a few feet of the stove over night. This process is repeated several times where the commodity is not quickly sold,

and the main destroying factor in connection with this method of procedure with the cranberry in particular, is the fact that in the fall the fruit remaining on the sidewalk becomes very cold and its temperature very frequently drops down into the 30's and 40's. While these temperatures do not necessarily injure the fruit by chilling, they are temperatures which are far below the average dew-point or so-called humidity temperature of the air of any normally heated room, and the cold fruit thus being brought in, from the sidewalk, into a warm room, will, like a cold pitcher of water in summertime, cause the condensation of some of the room's atmospheric moisture upon its surface. This condensation of moisture upon the fruit offers the very best opportunity for the decaying of the fruit, as it enables any rot fungus to lodge upon the fruit and permanently remain there owing to the moist condition of the fruit's surface.

As I said before, this factor is not of as material importance with large fruit like apples as it is with smaller fruit like cranberries, owing to the fact that a barrel of apples contains very much larger air spaces between the fruit which will enable this fruit to dry quite rapidly, while the small air space between the cranberries in a barrel permits this fruit to dry very slowly under the most favorable conditions. During the period this drying is going on any rot fungus that may be present or has lodged upon the fruit will be working more actively than it would have done had the fruit been kept at a uniform temperature and not permitted to "get wet."

In the production of cranberries as in the production of other fruits, varieties are of considerable importance. The early varieties for early harvest and early market and the late varieties for late harvest and late market. But, aside from this, an important factor governing both early and late varieties is the selection of large varieties. Considerable data on the number of berries needed for one quart of the different varieties has been gathered in the past, and it is found that it requires 480 berries of our native Belle-and-Cherry to the quart or 48,000 to the barrel, while some of the medium varieties, as for instance, our Howe's, or the Belle-Bugle, require 380 to the quart and 38,000 to the barrel. The fancier varieties of the Jumbo type or of the large Cherry types require only 220 to the quart or 22,000 to the barrel. From this it will be seen that areas planted to the native varieties, covered with an average stand of uprights, if planted to a fancy variety with this same number of uprights to the area and producing approximately the same number of berries, would more than double the size of the yield, merely as a matter of difference in the size of the fruit irrespective of the general fruiting tendency of the varieties. In fact, some of our fancier varieties are very prolific, and furthermore, with the production of the fancier varieties upon the areas that are cultivated a more ready market

is found for the fruit as the majority of consumers purchase fruits of any kind for their looks rather than for keeping quality or flavor. Indications are that a comparatively small per cent of the consumers actually pay attention to keeping quality of fruit that they purchase, but want the fruit in good condition at the time of purchase.

The ratio of selling price to cost should be established on a reasonable basis, so that neither producer nor consumer would have much ground for complaint that certain products, especially fruit, were selling at an exorbitant price compared to the wholesale market price as quoted in the trade journals. To illustrate: If retailers today are buying cranberries as quoted upon the market for \$4.50 to \$5.00 per barrel for the common stock, or as high as \$6.00 to \$6.50 or even up to \$7.00 per barrel for the fancy stock, it does not seem reasonable that such retailers should charge 10 cents a pound for the common stock or 12½ to 15 cents per pound for the fancy, as we know the standard cranberry barrel contains 100 pounds of cranberries, or in fact, it will usually run from two to five pounds over, so that we may consider cranberries purchased at \$5.00 per barrel as having been purchased at 5 cents per pound, and as I stated, it seems unreasonable that such fruit should be retailed at 10 cents per pound. Such a retail price unquestionably is an outrage against both the producer and consumer. It would further seem that this lower priced fruit bought at the above price should at the very most be retailed at a figure, say three pounds for 25 cents, and in many cases it would be feasible to sell four pounds for 25 cents. The fancier varieties, being purchased at from \$6.00 to \$7.00 should at a time of low prices, it seems, not need to be sold at prices above 10 cents per pound. Instead, it will be found that the large majority of retailers are asking a shilling or more. The same holds true with apples, as for instance, let us see what sometimes happens. A certain apple grower within 25 to 40 miles of a city grows apples and sells them to dealers in the city at \$4.50 per barrel. Then these city dealers take these same barrels and retail them at a price of \$6.50 per barrel, in barrel lots, delivered to the home of the consumer; and others of these same apples retailed in smaller quantities at the store are known to bring the retailer between \$8.00 and \$9.00 per barrel. Does this really mean that it costs a city dealer, in addition to freight and a fair percentage on his investment, approximately \$2.00 a barrel to deliver a barrel of apples from one of the city railway freight houses to the home of the consumer? Questions like these are some that cannot help but present themselves even to those who figure that all men should make a fair earning on their investments. It also illustrates some of the reasons why we find strong agitation on foot advocating the "producer to consumer" route for many crops. In order to avert the full carrying

out of this "producer to consumer" movement, it would seem very important that some coöperative movement should be established to connect the common interests of the producer and retailer of any fruit, a movement which would be of considerable consequence, and of much benefit to both parties. For instance, if the retailer could fully realize how much care the average fruit packer gives to packing fruit for market, and would attempt to learn from a reliable source something of the proper way in which to handle fruit to the best advantage in order to preserve its keeping quality upon the open market, the resulting outcome of such study would be mutually beneficial to both producer and retailer, and, of course, in the end would be beneficial to the consumer.

It seems, also, that it would be very appropriate for the fruit growers of Wisconsin to adopt some slogan that would suggest: "Wisconsin fruit first for Wisconsin." With this end in view the producers, by taking proper steps to get in closer touch with the retailers of their own state should be able to secure the distribution of the state-grown fruit much more largely in their state, rather than to permit so much outside fruit of the same quality and variety to be shipped in from distant points to compete with their home-grown product. Such importations simply represent an unnecessary cost, from which only the transportation companies will reap a benefit. The consumer in the end is really receiving a poorer quality of goods by using the imported material in preference to the home-grown, even though the prices might vary slightly. The freshness of the product, it seems, should count for something in the value, and the producer should, in his own state, be able to sell his product at a price that would warrant its quick sale against the same product imported when the transportation expense has been added to the product.

As stated earlier in this paper, the fruit receives considerable hardship at the hands of the retailer, owing to the unsystematic handling, but the general public does to a certain extent assist the retailer in continuing the hardship of some of the fruit handled. This is done in various ways. One is the frequent handing of the fruit on display, and another is the purchase of very small quantities for the sake of securing so-called fresh fruit through different parts of the season, and paying no attention to the fact that most fruits can be bought more cheaply in larger quantities and at certain seasons and can be in many instances preserved to better advantage than to depend on their keeping as fresh fruit. The sooner the consumer can come to realize the advantage of purchasing larger quantities of fruit when it first appears on the market and preserving same in a suitable way, the sooner he will help to eliminate much of the waste that at present is going on in connection with the entire fruit trade,

owing to the fact that so much of it has to be held in store merely to be dished out in very small quantities. One way to assist in the elimination of this waste in the way of the loss of cranberries by their late keeping, is to try out some of the following recipes, and it will be found that fruit purchased early in the season makes very much better preserves than that purchased after long keeping, since most fruit that has been kept for an extended period becomes a little poorer in flavor and has a much tougher skin.

CRANBERRY SAUCE

1 quart cranberries
1½ cup granulated sugar
¼ cup water

Cook until tender and mash gently with a spoon to crack the skins; remove from stove and add the sugar and a pinch of salt. Do not cook after sugar is added.

STRAINED CRANBERRIES

1 quart cranberries
1 pint boiling water
1 pint granulated sugar

Boil the cranberries in water until tender. Strain through a colander to remove the skins, return to the fire, boil five minutes, add the sugar, boil another five minutes, and put in moulds immediately to cool.

CRANBERRY JELLY

2 quarts cranberries
1 quart water

Cook until fruit is tender and strain through a thin cloth. Heat the juice and to each pint add ¾ pound granulated sugar and stir until dissolved, but do not boil.

CANNED CRANBERRIES

1 pint cranberries, pack raw in can and seal, boil half hour, make rich syrup, planning on one cup of sugar to a pint berries. Remove cover, fill with the syrup, seal, let stand two weeks before using

CRANBERRY CONSERVE

Chop coarsely 5 pounds cranberries, 2 pounds raisins, then juice of 6 oranges, 5 pounds sugar, cranberries and raisins. Heat and simmer slowly until thick like jam. Put in jelly glasses.

"On account of the acid in cranberries they should always be cooked in earthen lined vessels, granite, agate ware or aluminum, but never in tin or iron.

Even an article of food containing but a small amount of cranberries should not stand in other than glass or earthen dishes.

Use good granulated sugar only."

One quart of cranberries is equal to one-half peck of apples when cooked.

No waste of time or material to prepare cranberries.

COMMERCIAL FRUIT GROWING IN BAYFIELD—PAST, PRESENT AND FUTURE.

J. M. BLACK, Bayfield.

In this short paper on horticulture in Bayfield county I wish to impress upon you the fact that every effort has been put forth to ascertain the truth, knowing that *it* in its awkward presentation has more lasting results than falsehoods clothed in the most flowery rhetoric.

If you please, then come with me on a trip to the forests of the Bayfield shores. We will forget the modern and conventional improvements of today and go back to 1800, when the forests stood so thick as to exclude the sunlight, and deer and fur bearing animals were in greater numbers and the Chippewa Indian was king of all he surveyed.

At this time fur trading was the sole excuse for white men to inhabit this region. With the fur traders there came in 1800 a missionary, Father Marquette, who established a mission on Madeline Island and made the first effort at educating and converting the Indian.

True it is, that as we look at horticulture in a broad sense, it is a factor in educating a people. I doubt though that Father Marquette had in mind this thought when he set out the cherry trees the fruit of which he hoped would grace his table. This then, was the beginning of horticulture, in Bayfield, and he planted wiser than he knew, for as we retrace our steps through the years, we find this cherry not only grew but bore fruit in plenty that went to balance the diet of the Indian as well as of the white man. Its influence, perhaps, was not so far-reaching, but it was strong enough to induce Mr. Prendegast to set out the first nursery in this region in 1868. After a few unsuccessful years Mr. Prendegast's ventures failed, and all that is left as a monument to his good intentions are the fruits of all kinds growing wild where once was his nursery.

During the same decade a Mr. Tate set out the first apple trees and there are still some of these same trees bearing fruit within the city limits of Bayfield. Mr. Wilkinson has in his yard trees of this man's planting that have been bearing good crops for the last twenty-nine years.

It is safe to say that the use of spray solutions and spray machinery was not practiced through this interval of the pioneer days, and yet, we find this cherry is healthy, prolific, and will reproduce itself from seed, which, we feel, is a most desirable feature.

We have come now to a period when selection of soil and better culture is most essential to fruit growing. In our choice of soils, we have heavy clay, in which is a large quantity of lime; medium light loam with clay and gravel subsoil, though somewhat deeper.

Much has been said derogatory to our light loam soils. I wish to explain that our light loam is more productive than the same kind of soil in more southerly territories, for the reason that it has a retentiveness of moisture that is impossible to find in those regions because of their rapid evaporation. This is one of the salient characteristics of this whole territory and to judge it at once by southern localities is grossly misleading.

I know of no better way to describe the topography of this peninsula than to take you to the top of one of our long hills and let you look far away across the valley, the distant hills looking like small foothills to a more distant range of mountains. Each hill as you climb it you find has ideal water drainage and air drainage. Each hill, too, looks out upon Lake Superior and across to the blue hills of Minnesota, or else, across Chequamegon Bay to the Iron Mountains of Michigan. The air shifts from off the lake, now southwest, west, northwest, north, northeast, and to east from Chequamegon Bay, air so pure, so free from the hot arid landscapes, common to lower Lake Michigan. The temperature is so modified by this great body of water as to reduce to a minimum the possibilities of a late or killing frost. This is at once plain when you come to know the conditions as they exist in the spring when the ice along the shores of the lake and bay holds down the temperature to a late date, the budding of trees and bushes is delayed correspondingly, and by the time the last cake of floating ice succumbs to the rays of the sun, the temperature of the land has warmed up with the advance season so that killing frosts are unknown. And as the temperature of the lake warms through the summer it, in like manner, holds back the frost to a late date in the fall, thus giving us from May 10th to October 25th, or 145 to 160 days free from killing frosts. The temperature ranges from 104 in summer to 24 to 28 below in winter, yet again, the lake lends its influence in holding off the blisters of the heat and the sting of the cold. Situated as we are, but a few hours by boat or rail from Duluth, St. Paul, Minneapolis, Chicago, Milwaukee, and hundreds of other cities and towns, gives us an outlet for our fruit that no other fruit center can boast of.

Can you imagine then a more beautiful landscape, a more delightful climate in which to live and be happy, and more desirable conditions to grow fruit?

With the cool summer nights and heavy dew that come to freshen the strawberry plants after being mopped over and over by the pickers, we are able to produce berries that are second

to none, coming at a date when they are practically free from competition on the market.

The strawberry was the leading fruit in this new enterprise of the pioneer settlers, and as the lumbermen cleared away the forests, the settler followed close behind and found soil and conditions ideal for fruit of all kinds.

It remained though for the more observing to note the possibilities in fruit on a large scale, and this marks the beginning of fruit growing on a scale that rightly places it in the field of horticulture.

As land was made ready it was evident that with the expense of cleared territory there must come a corresponding larger variety of fruits to be grown and the apple, cherry and crab and all the small fruits and vegetables have been added to the strawberry.

The strawberry, important as it is, has already dropped back to second or third place, for our apples are of excellent size, flavor, color and keeping quality, and also destined to be as widely known and as popular as the apple of the Great Northwest. In 1910, the first real business-like manifestation of the fruit growers was the organizing of a Fruit Growers' Association, and after a few ripples on the sea of organized effort, we are one solid organization. The first fruit marketed was strawberries grown by Mr. F. V. Holston and sold to residents for \$4.00 for 24 quarts. The first commercial fruit crop marketed in Bayfield district was in 1910 when 2,000 crates were shipped to Duluth and marketed direct to the retail dealers in surrounding cities and towns of this section of Wisconsin, northern Michigan and Minnesota. (The total number of crates grown in 1910 was 2,500 of strawberries. The first train load of fruit shipped from Bayfield was on Sunday in July, 1911, consisting of seven cars of strawberries destined for Minneapolis and points beyond.)

In 1911, about 18,000 crates were marketed, and in 1912, about 80 cars strawberries in addition to bush berries and apples.

In 1913, we had less strawberries and more of other fruits, and in 1914, we had but 8,500 crates of strawberries and 9,000 bushels of apples in addition to other small fruits.

In our four years of commercial fruit growing, we have averaged \$1.53½ for every crate of strawberries and \$1.10 for every box of No. 1 apples and \$2.00 for raspberries (24 pints), and good prices for all other fruits except blackberries, which ripen too late to command a good price.

I will not attempt a forecast of the future but we are all planting trees.

FRUIT RAISING IN DOOR COUNTY, WISCONSIN.

A. C. GREAVES, Sturgeon Bay.

Some forty years ago, when the timber had been cleared from small tracts of land near the city of Sturgeon Bay and the few settlers had turned their attention from logging to the tilling of the soil, a few of these settlers set out apple trees where the pines and maples had stood. These trees grew splendidly and produced bountiful crops of fine apples without pruning, spraying or cultivation. All this time Door county was held in high repute for the excellent quality of its pine trees. When the pine and other timber had been well cleared off, the foremost question was—what to do with the land. The tracts that at this time were under cultivation produced immense crops of grain and grass but the yield per acre was only a little better than could be raised on prairie land that could be put in cultivation at much less expense.

In the year 1892, Mr. A. L. Hatch, then of Richland Center, and the late Prof. E. S. Goff, of Madison, came to Door county to investigate its probable resources as a fruit producing country. After a thorough investigation they decided that it had great possibilities for fruit and the experience since then has demonstrated that their judgment was good and their faith well founded.

A company composed of A. L. Hatch, E. S. Goff and D. E. Bingham was formed and they purchased a tract of land near Sturgeon Bay and the fruit industry was begun. In 1893 this company planted ten acres of plums of the European and Japanese varieties and the next year this was increased to sixteen acres, but mostly of the European variety. In the spring of 1896 Hatch, Bingham and Goff set out three acres of cherries, Wm. B. Lawrence one acre, and B. F. Otis one acre; at this time Hatch, Bingham and Goff set out twelve acres of apples and two acres of currants. The next year Mr. A. W. Lawrence set out five acres of cherries, Wm. B. Lawrence three acres of cherries and five or six acres of apples. In 1898 Hatch, Bingham and Goff increased their cherry plantings to ten acres and they also set out four acres of raspberries. The next year Mr. Hatch, who had taken over the holdings of the original company, planted seven acres more of apples.

During the next ten or eleven years small plantings of apples, cherries, plums and small fruits were made by landowners in the near vicinity of Sturgeon Bay and occasionally by some one in a more remote part of the county. Immense crops of strawberries of an unusually fine quality were raised and marketed

at good prices and all this time the few cherry orchards were increasing in quantity of product and producing a fruit of such quality as to be noticeable in any markets in which they were placed. By the year 1908 Door county was attracting considerable attention as a fruit growing district, especially for its cherries, but a planting of ten acres was up to this time the maximum.

The spring of 1910 marks the beginning of big things in orchard planting. At this time D. E. Bingham and A. W. Lawrence organized the Sturgeon Bay Orchard and Nursery Co. and planted out forty acres of cherries and about twenty-one acres of apples. During this year several stock companies were organized and many private individuals made ready for still larger developments and the spring of 1911 saw thousands of cherry, apple and plum trees being planted, The Coöperative Orchard Co. making the largest single planting—that of two hundred acres of cherry trees. The following two years the planting was carried on to even a greater extent, not alone in the vicinity of Sturgeon Bay, but in the vicinity of all the villages along the Green Bay shore throughout the peninsula, until at the present time a careful estimate of the acreage for the county is at least four thousand acres of cherries, about seventeen hundred acres of apples, and about two hundred acres of plums.

So much for history and progress. As for reasons why this district is so well-adapted to fruit raising there are three principal ones; soil, contour of the ground, and climate.

The soil is a heavy loam of from one to four or five feet in depth, overlying lime rock. The close proximity of this rock to the surface provides ample drainage in wet weather and also affords a reservoir of moisture during dry weather for the feeding roots, which penetrate its seams, and this rock as it disintegrates furnishes valuable plant food.

The contour of the ground is generally rolling and rough, the hillsides making possible air drainage which has much to do in warding off late frosts.

Surrounded by the waters of Lake Michigan and Green Bay, the climate is well-adapted for fruit raising, the warmth of the waters in the fall keeping off frosts until late so that the fruit buds may form and develop and the new growth properly mature while the foliage is yet on the tree. In spring the reverse is true—the cold winds from off these chilly waters retard the starting of the buds until all danger of a late frost is passed. The summers are cool, especially the nights, so that the fruit may properly grow and develop without being subjected to continuous and excessive hot weather.

As to varieties of fruit grown; of cherries the Early Richmond, and Montmorency, are practically the only ones grown. A few trees of English Morello, Baldwin, Late Duke, etc., were set out

but experience has proven that these varieties were not commercially adapted to this country.

Of apples, the early plantings consisted largely of Wealthy, McMahan, N. W. Greening, Snow and Duchess, with enough to test of Sutton's Beauty, King, York Imperial, Lubsk Queen, Baldwin, Newell, Ben Davis, Gano, Beautiful Arcade, Scott's Winter, Windsor, Avista, Wolf River, Russet, etc. Of these last named varieties they have proved valuable in small plantings only and are not profitable in commercial plantings. It may be said that the failure of these to prove profitable is largely due to climatic conditions, some developing poor foliage but many being subject to frost canker which soon kills the bodies of the trees. However, the Windsor and Wolf River are usually included in the larger plantings to some extent. At the present time the commercial plantings are largely made up of Wealthy, Duchess, Snow, McIntosh, Dudley, N. W. Greening, Tallman and McMahan, this last variety is not largely used on account of the failure to get the peculiar white color early enough to get on the market in competition with the same variety grown farther south. Considerable plantings have been made of Delicious, Patten's Greening and Liveland Raspberry but at present nothing can be said concerning these varieties in this country. One variety that seems to be a splendid variety here is the McIntosh and with it might be included the Snow as they both develop exceptionally fine size, color and quality, and bring good prices on the markets.

As to how these orchards are cared for, most of them are cared for individually, as with one exception they are owned by individuals or by stock companies. The Coöperative Orchard Co., the largest holder, has seven hundred acres of cherries all in one block. This company has sold several five, ten or twenty acre tracts but assumes the care for a period of years varying from three to ten years. The other stock companies or individuals either have their own equipment or arrange with some one who has to do the work for them in caring for the orchards. The larger part of the plantings are in the hands of stock companies whose holdings run from forty acres to two hundred and forty acres and in the case of The Coöperative Orchard Co., seven hundred acres.

In 1910 the first step to get the growers together for better marketing was made by the organizing of The Door County Fruit Exchange. This organization was a stock company organized to sell the fruit of the growers collectively. The expense was prorated at an equal amount per case at the end of the season and each grower received the same amount for his fruit on the basis of the average of the daily sales. The business was handled by a board of directors who elected a manager. The prices received for fruit were the top of the market and by having all fruit pass through one selling agency there was no competition locally in

selling. As to the future of this country and industry I would say that since the spring of 1913 there has been no large or extensive planting, at least not in cherries as one can reasonably see that the acreage now in process of growth is all that can reasonably be cared for and picked. The first cherry orchards planted are now beginning to go down so that from experience we can say that the average life of a cherry tree is about twenty years.

Of apples there seems to be ample room for considerable more development as this is not so perishable a fruit as cherries and it is safe to say that the quality of the fruit together with an increasing demand and nearness to market will always give advantage over the much famed western apple. More attention must be given to the package and packing in order to get the best price.

Of plums the acreage is quite limited and largely confined to the Burbank, Lombard, Gueii, Bradshaw, etc.

Of small fruits we still raise a large crop every year, but this acreage will not be very much increased owing to the highly perishable quality of this fruit. There is a considerable acreage of gooseberries and currants but just what the result will be when these reach maturity remains to be seen. At present the market seems to be decidedly limited for this fruit.

It is self-evident that we have got to solve some great problems in marketing and to obtain help to pick the cherries. We are now investigating and trying different ways of getting help and we have no hesitancy in saying that we shall be able to handle the situation all right. When one is told that it takes at least five good pickers per acre in a fully matured orchard, we are often asked, "Where will you get the pickers when these trees are fully matured?" To be frank about it all these trees will not reach maturity. Some orchards are planted on ground that would never produce a good crop of cherries, some orchards on account of the ignorance or conceit of the owners or caretakers are being greatly injured by the care they receive and methods of cultivation pursued. Other owners will become tired of the long wait from the planting to a profitable crop and by sheer neglect will allow the trees to die out.

But in this as in all other industries, the one who plants on good ground, industriously and scientifically cares for the trees and puts good business sense into the management and handling of his proposition, to that person or corporation, the Door county orchard will be a source of good revenue on the investment and will furnish a dwelling place in one of the most beautiful spots that the sun ever shone on.

THE KICKAPOO VALLEY WISCONSIN'S FAVORED FRUIT DISTRICT.

J. A. HARLEY.

"Now faith is the substance of things hoped for; the evidence of things not seen."

Without faith no great enterprise is ever undertaken.

By faith the work of this Society is undertaken for the advancement of the horticultural interests of the state.

By faith Trial Orchard No. 8 was planted at Gays Mills and carefully nurtured to maturity.

By faith John Hays, of Gays Mills, like the voice of one crying in the wilderness, came preaching the gospel of commercial orcharding in the Kickapoo valley.

And by faith he and his converts have succeeded in establishing a fruit center at Gays Mills, nor will they cease their efforts until they realize the full fruition "of the things hoped for."

Faith has played such a large part in the development of the Kickapoo district that I feel constrained to speak of it in this manner. When we began the development of this new center there was little more to show visitors to Gays Mills than the state orchard of five acres, and a few old farm orchards. We were obliged to ask our friends to take things on faith. Now after four years of effort we are glad to report 1,500 acres under development in the vicinity of the state orchard.

THE KICKAPOO IS DIFFERENT.

The Kickapoo differs from other orchard districts in respect to rock and soil formation; elevation and drainage; methods of orchard culture; varieties of crops and system of district development. Because of these differences and, for the additional reason that to most of my hearers the Kickapoo is as yet an unknown book, I deem it necessary to go somewhat into detail concerning the natural advantages of the district and the causes that led to the forming of a fruit center at Gays Mills.

THE KICKAPOO VALLEY.

The Kickapoo valley is the name applied to that section of Wisconsin drained by the Kickapoo river. This is a small stream whose source is near Wilton, Monroe county, and which, after crossing parts of Vernon, Richland, and Crawford counties, empties into the Wisconsin river at Wauzeka, 18 miles east of Prairie du Chien. Strictly speaking, the Kickapoo fruit district

today means only the district at Gays Mills, Crawford county. But we prefer the larger term, believing that in time the whole Kickapoo valley will be one vast apple orchard.

THE OZARK REGION.

The similarity of the Kickapoo region to the Ozark country of southwest Missouri is very striking. There is the same formation of rocks and ridges, of high plateaus and deep valleys. Wisconsin has no mountains, geologists tell us, but these hills and bluffs along the Kickapoo valley strongly suggest them and might very properly be called the Kickapoo mountains.

The scenery also suggests the mountains. Bold crags greet the eye at every turn of the river, keeping watch as it were, over the peaceful valley beneath. Sometimes the bluffs are low and receding but more often they rise almost perpendicularly to heights of four and five hundred feet, their summits crowned with forests of oak and hickory, birch and maple. To the lover of nature, who would pursue some unbeaten path, let me commend the Kickapoo valley. For picturesque scenery it is unsurpassed anywhere in the middle west.

THE DRIFTLESS AREA.

Geologists call southwest Wisconsin the "Driftless Area" or the unglaciated section of the state. The huge boulders, gravel ridges and other evidences of glaciation, so common in the eastern part of the state, are here conspicuous by their entire absence. Those titanic glaciers that leveled off the mountain tops and filled the valleys with their debris were more considerate of the Kickapoo and left the Kickapoo region free and undisturbed in all its primeval grandeur. Then the elements fell to work and fashioned the land into high ridges and deep valleys such as fruit men call ideal apple lands.

"WISCONSIN'S FAVORED FRUIT DISTRICT."

The Kickapoo valley has been called "Wisconsin's favored fruit district" because so highly favored by nature. These natural advantages may be summarized as follows:

Location—In the Highlands of southwest Wisconsin.

Elevation of Orchards—450 feet above the valley; 1,200 above sea level.

Drainage—Both soil and air drainage well-nigh perfect.

Soil—A clay loam of great (1 to 50 feet) depth and fertility.

Rock formation—Sedimentary limestone to a depth of 200 to 300 feet.

Plant Food—High percentage of lime, potash, iron, phosphorus and nitrogen.

Rainfall—Mean annual 40 inches. No irrigation necessary.

Conservation—The deep porous limestone bed, a natural reservoir.

Seasonal rainfall—23 inches. Droughts are unknown.

Winter humidity—81 per cent. No winter killing of trees.

Temperature—Mean annual, 45 degrees, or 1 degree higher than Bitter Root, Montana.

Lowest Recorded Temperature—29 degrees or 4 degrees higher than Bitter Root, Montana.

Spring temperature—Mean for the blossoming period, 46 degrees.

Spring frosts—Average last killing frost, April 23, or 17 days before the average blossoming time of Duchess apple.

Growing season—175 days, about the same as Wenatchee, Wash.

“Effective Heat”—A mean temperature of 23 degrees during growing season.

Ripening of Fruit—Early and catching the early market.

Ripening of Wood—New growth ripens leisurely and hardens before winter.

Coloration—The long sunshiny summer combined with the chemical elements of the soil accounts for the high color for which Kickapoo fruit is famous.

Add to these natural advantages our proximity to the large city markets; our cheap freight rates; the low price of land and orchard development; the variety and certainty of good crops; the facilities for marketing; the high color and quality and, consequently, the high prices obtained for Kickapoo fruit, and one has a combination of advantages unsurpassed anywhere in the country.

THE HISTORICAL KICKAPOO.

Long years ago this region, now the home of the red apple, was once the home of the red man, whose name it bears. The Kickapoos were a peaceable people, devoted to agriculture and the peaceful arts. But their habitations faded away many years ago and only the magic of the name remains.

The first settlement in Crawford county was made in 1781. Just when the first land was tilled and the first orchard planted we do not know. But it must have been all of a hundred years ago, for there is on record, in the office of the county recorder, the transfer of the “orchard farm” in 1824. Fruit growing, therefore, in this region is no new and untried venture; it is as old as the country itself.

THE DISCOVERY OF THE KICKAPOO.

To Frederic Craneheld, Secretary of the State Horticultural Society, must credit be given for discovering and proclaiming the possibilities of commercial fruit growing in the Kickapoo valley.

For some years stories had reached his ears of the wonderful fruit grown "away back there among the hills." Finally, he decided to make an investigation upon his own account. Setting out on foot one fall, he explored a considerable portion of the region—up one side and down the other. Eureka! He had found the place, for such orchards and such fruit could be grown only in the Kickapoo.

Mr. Cranefield returned home enthusiastic over his discovery and the possibilities of the region. "If such fruit can be grown on farm orchards, what may not be accomplished under scientific care," he exclaimed. Later, in his report to the State Horticultural Society, he said: "Crawford has some of the best apple lands to be found anywhere in the United States. On ridges on either side of the Kickapoo river from Wauzeka to LaFarge, west to the Mississippi and east to Richland county, are thousands of acres of fertile clay soil with air and soil drainage that produce the finest Wealthy, Duchess and McMahan in all the world. Crawford is destined to become one of the leading apple sections of the United States."

TRIAL ORCHARD NO. 8.

Upon the recommendation of the Secretary, this Society decided to plant a trial orchard upon some favorable site in the Kickapoo valley. The exact location fell to Gays Mills, a town midway up the valley, and here Trial Orchard No. 8 was duly planted.

Concerning this orchard last year, the Crawford County Independent said: "In the spring of 1908, the Trial Orchard Committee of the State Horticultural Society selected a site upon the east bluff above Gays Mills for a demonstration orchard. This region had long been known for the quality of its fruit and the abundance of apples grown upon neighboring farms. The object sought, therefore, was not so much to prove that apples could be grown as to demonstrate the possibilities of commercial orcharding in the Kickapoo.

"The site chosen is ideal for an orchard. It is on top of the bluff 450 feet above the valley, with a gradual slope to the north. Originally an acre each of five varieties of apples was planted. The next year an acre of cherries and one of grapes were added. Still later two acres of winter apples were planted. The oldest trees, therefore, are five years old, and some of them, the Wealthies, will yield their third crop of apples this fall. It is estimated they will average a bushel a tree, some trees a barrel apiece. The vineyard also has a large crop. This record is considered most remarkable. It is doubtful if it can be excelled anywhere in the country. Certain it is the results in Trial Orchard No. 8 have justified the faith the State Horticultural Society had in the Kickapoo."

THE AWAKENING.

In 1911 the first report of the growth and condition of Trial Orchard No. 8 was published. It attracted instant attention. Yea, more, it challenged belief; for here was an orchard whose record of growth, vigor and early bearing was the equal of anything in the much-tooted northwest. Such an orchard was worth seeing. Experts came, they saw and were conquered. They found the orchard to be even better than reported. "If the state can do so well, why can't we?" they asked and answered their own question by deciding then and there to start a new fruit center at Gays Mills.

THE DEVELOPMENT OF THE FRUIT CENTER.

The state's experiment proven and a fruit center at Gays Mills assured, outside capital came seeking investment, provided some concern could be found to undertake the planting and care of orchard tracts. To meet this demand the Kickapoo Development Company was organized with a capital of \$24,000.00. The company owns no land and is engaged in no land schemes. Its principal business is the planting and care of orchards under contract. The company operates under a general manager, in charge of the business end, and an expert orchardist, in charge of the orchard work. Thus far this company has secured all of the larger contracts. Their present plans call for the planting of about 25,000 trees next spring and the care of about 800 acres of young orchards. With the completion of the spring planting, the orchard district will extend back on the bluff, east of Gays Mills, for three miles. The Kickapoo papoose is young yet, but it is growing, and age and acreage considered, it will compare favorably with the best.

HOW IT WAS DONE.

A common practice in the west, in forming a new fruit center, is to organize a corporation with a \$1,000,000.00 or more of capital, buy up some cheap land, plant it to trees and then begin to exploit the proposition. In Wisconsin, the fruit districts have grown up in some favorable locality through the accession of individual growers, until finally, came the formation of orchard companies.

In the Kickapoo it is different. Here the orchard companies came first, and our more rapid development is due to the increase in size and number of these companies. They are formed in various ways, sometimes as a partnership but more often as incorporated stock companies with capitalizations from ten to twenty thousand dollars. At the present time, there are twelve of these orchard companies. They own the land and the Kickapoo Development Co. is their servant. Of late individuals are buying orchard tracts, a class much to be desired and to whom every inducement is offered.

THE KICKAPOO METHOD OF ORCHARD CULTURE.

As regards orchard technique, our methods are also different. They are the result of much study and experience and, we believe, for our peculiar conditions best suited to get results. We follow neither one of the so-called orthodox methods of "clean culture" and "sod mulch" but instead, have worked out a system all our own. As soon as practicable, one or two years after planting, we aim to seed down the orchard to clover. The following year the trees are cultivated by plowing up alternate strips across the orchard. The next year these plowed strips are reseeded and the remaining strips plowed under. By this method one side of every tree receives cultivation annually while the other side feeds on clover. The trees get all the cultivation they need and make all the growth necessary. We consider a growth of one to two feet on spring planted trees and two to four feet on yearlings very satisfactory.

VARIETIES PLANTED.

A commercial orchard is not primarily an experimental orchard. Fortunately we have one such in our midst maintained by the state and we are perfectly willing she should experiment with as many kinds of fruit and in as many ways as she pleases. The results will be of incalculable benefit to the orchard district.

On the other hand, in selecting varieties of apples for our commercial orchards, we have been governed largely by the varieties found in the old farm orchards in the vicinity. The presumption is that varieties known to do well in the farm orchards will do equally well in the commercial orchards.

One fourth of all the acreage at Gays Mills is planted to Wealthy and one-fourth to McIntosh Red. Other fall varieties are Fameuse, Dudley, Duchess, and McMahan White. Winter varieties are planted to a limited extent, such as Talman Sweet, Northwestern Greening, Jonathan and Winesap. "Why don't you grow more winter apples? Don't they do well out there?" are questions frequently asked. Certainly they do well and we can grow as fine winter apples as any section of the country. The reasons for not growing them are commercial rather than physical. There is more money in fall apples, and that is reason enough.

THE KICKAPOO ORCHARDIST.

The Kickapoo orchardist is most favorably located for the growing of fall apples. Within a radius of 300 miles of his orchard are 10,000,000 mouths waiting to be fed. It is his privilege to feed the apple hungry when their hunger is keenest. He grows an apple of high quality; it ripens early, finds a ready sale in the city markets at a good price, often a dollar per barrel better than his New York cousin obtains for his winter varieties. No storage charges. A quick sale and quick returns. His crop sold and the

money spent before his New York cousin begins picking. Still another consideration is the fact that fall varieties mature early, bear heavily and are self-sustaining at 6 to 8 years of age. Winter varieties, on the other hand, are seldom profitable short of 10 to 15 years. In the face of these facts it is hard to convince our growers to plant extensively of winter varieties.

FUTURE PLANS.

We hope to make the Kickapoo district second to none as an apple section. At our present rate of growth it will not be many years until several thousand acres will be set to orchards. But long before these trees come into bearing, we hope to have more improved roads; an enterprising fruit growers' union; a canning factory, evaporating plant, cooperage factory and all the other adjuncts of a large and up-to-date fruit industry. These and other improvements must come, and will come, as the needs of the industry are made manifest. The opportunity is here; the door is open and daily we are drawing nearer to "the things hoped for."

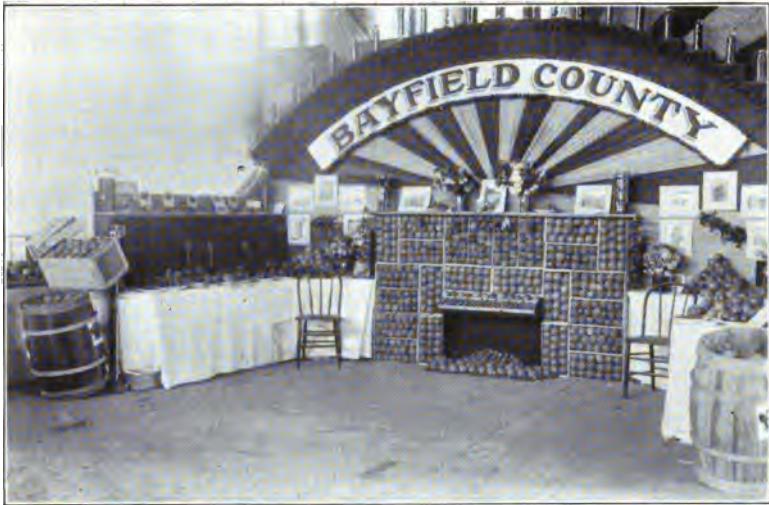
COMMERCIAL ORCHARDING IN RICHLAND COUNTY.

G. H. TOWNSEND.

When Mark Twain first met Brigham Young, he asked him how he liked married life. "I hardly know," says Brigham. "I haven't gotten very far yet, I only have twenty-two wives." "How do you like it as far as you have got?" says he.

I have had five years of observation and two years of experience in Richland county and I can tell you the results as far as I have "got." Richland county is a continuation of the Baraboo range of hills or ridges. These ridges have a northerly trend and are three to five hundred feet above the level of the lower Wisconsin river. Between each range of ridges is a large creek or river flowing through fertile valleys. These streams are intersected by rivulets and creeks and small valleys without streams. The valleys operate as catch basins for the cold air of late Spring and early Autumn frosts. Thus they protect the bloom in the Spring and give longer season for maturing the Summer's growth of twigs and buds of the various fruits. The soil is mostly a loamy clay with here and there patches of clayey loam. I have no record of observations but an impression that trees grow faster on the lighter soil and bear the best on the heavy.

There are a number of orchards in Richland county of twenty to forty acres and still more of from five to twenty acres, and the crop of 1913 was over 25,000 bbls. shipped out of the county. The crop of 1914 was about 2,000 bbls. My own crop was 2,200 bbls. in 1913 and 750 bbls. in 1914.



Special Bayfield Fruit Exhibit Horticultural Hall, State Fair, Milwaukee, September, 1914. The Agricultural Exhibit from Bayfield County was staged in the County Exhibit Building



Big red apples from the Kickapoo: State Fair, Milwaukee, September, 1914.

Orchard care in Richland county is not ideal. This is partly due to some question on the part of the growers as to how far care can be profitably carried, the inefficiency and insufficiency of hired help, and part to other causes. As to the first proposition! There are conditions where less than the ideal is desirable, which I will illustrate by my own experience.

Though I did not have possession in 1912, I thinned the tops of part of the orchard. In the Spring of 1913, I started to prune more extensively but it rained, and rained, and rained. Then I remarked to my help that if it was going to rain all the time, it wasn't necessary to remove the surplus top. In 1914, I again began to thin out what seemed to be an excess of branches, but again it rained about every other day and again the pruning was postponed. Those trees that were ideally pruned and nourished made remarkable growth, but yielded but little fruit. My conclusion is that, if the orchard had been pruned up to my ideals I would have been hundreds of barrels of apples short of the crop I harvested. Do not misunderstand me! The gain from not pruning was merely an incident of extremely wet seasons under conditions where it was necessary to retard excessive wood growth. In the matter of spraying, it was far below the ideal, so that while less than the ideal in pruning resulted in gain, too little spraying resulted in considerable loss because there were too many No. 2 and cull apples. In this connection, I may remark that the Bordeaux sticks better, resists the rain and is effective against fungous diseases for a much longer time than lime sulphur, but it is worse to Russet apples and far less effective against curculio than sulphur. Curculio do not seem to eat enough foliage to die of arsenical poisoning, but all "bugdom" seem to want to get away from the odor of sulphur.

In the matter of cultivation, there is no system, unless it is the system of haymaking in the orchard. They call it the sod mulch, but it ought to be called cow mulch. The trees in such orchards have but few twigs—the result of stunted growth, and show evidence of general decline. Some growers raise crops as on farm land and others raise peas and turn the hogs in, when the peas mature. If this system could be practiced without too great damage to the peas in spraying, it would be highly successful, except in seasons of early drouth. Clean culture in level orchards is desirable, but difficult on ridges because of erosion. A good compromise is to plow a few furrows transversely to each slope between apple tree rows, and induce pigs to do the rest, by covering a few grains of corn here and there, so they will partly destroy the sod but retain enough to hold the soil. The pigs should be turned out of the orchard early in July, and root exposures, from rooting should be covered. Hogs kill apple trees, when turned into the orchard late in the summer at the time they ought to be turned out. Late rooting by pigs is late cultivation plus root exposure—a thing not permissible in good orcharding.

In varieties, the yellow transparent and Tetofsky are first to ripen, both are rather small trees and poor carriers. It is not a great exaggeration to say that the yellow transparent is green today, ripe tomorrow, and cracked open the third day. These varieties should not be raised for market except where they can be delivered by wagon or motor. The Lubsk Queen grown in Richland county has for some years sold at from \$6.00 to \$10.00 per bbl. The tree is a small upright grower and rather limited in crop volume. The quality is not high, but if you want to see three beauties; pick a rose, a Lubsk Queen apple and a Wisconsin woman. The Lubsk Queen is profitable and if its habits were better understood, might be exceedingly so. The lowland or live-land raspberry is not raised commercially. One tree yielded three barrels in 1913. It is a pink striped apple, good tree, good bearer, and the best quality summer apple. It ought to sell as well as good peaches in the northern market.

The Duchess grows splendidly, but its average low selling price keeps it out of the class of good money makers, though it is possible that better selling facilities would make the Duchess one of the most profitable. The McMahan is a Richland county product. It is a splendid tree, enormous producer and a good seller. A McMahan will yield three to four barrels, when well into bearing, per tree, and a light crop on off years. It bruises easily and is not a good carrier but is considered the most profitable apple in Richland county. It will grow on thin clay soils where other varieties will not succeed.

The Wealthy reaches the highest degree of perfection on our ridges and it will yield, in crop years, about two-thirds as much per tree as the McMahan and nothing on off years, but as one-third more to an acre may be planted than larger trees, like the McMahan, it could be made about four-fifths as profitable. The McIntosh thrives but is a slow grower and shy bearer probably due more to its tendency to scab than anything else. The Fameuse grows better on the nonglacial ridges than anywhere else within our knowledge of thirty-six states. Considering its longevity, bearing and selling qualities the Snow is the most dependable apple for profit if protected from scab.

When I took over the orchard, I regarded the Newell (which I insist on calling the more palatable name of orange winter) as worthless, but it yielded about two barrels to the tree in 1913, and one and a half barrels to the tree in 1914. It is a bad scabber in fruit and foliage and splits at crotches, but if protected from scab and wired to prevent breaking down, it has proven a big yielder and good seller as it is the best sauce apple grown in the world, but on account of being a poor tree it is not recommended.

The Scotts Winter is a commercial apple but is in disfavor with some of our leading growers, but I have found it a good tree, good bearer, good keeper and good seller. I was able to sell Scotts

Winter this year to customers of last year at \$3.00 per barrel, when New York Baldwins were bringing only \$2.25.

The Northwestern Greening is the leading mid-winter apple in Richland county. It is a rapid grower, but not an early bearer. The fruit and foliage are very susceptible to scab and the limbs commence to split off about time the trees get to bearing well and it would not be considered a commercial apple.

Where the ground is poor my Windsor Chief have blighted. Part way down the slope the trees have done well and one tree is the banner tree of all varieties. It produced four barrels in 1913, and three barrels in 1914, nearly all fancy stock that sold for \$1.25 to \$1.50 per bushel. On account of its blighting tendency, the commercial value of this variety is doubtful.

My Jonathan have yielded well, but crotch blights on poor soil. Those who have Jonathan on rich soil are enthusiastic. As it is a prolific bearer and does not scab badly it is valuable commercially on exceptionally choice locations.

My winter banana trees have not made a good yield in quantity of fruit, partly because both fruit and foliage scab badly. The demand for winter bananas at \$1.50 to \$2.50 per box is not met. It looks as though this variety properly handled, will give big returns in the future.

Numberless varieties are to be found in Richland county. Of these the late Duchess or "cranberry pippin," a pink striped sweet apple, and fall pippin are worthy of investigation. Whether the late Duchess is equal to the Wealthy or Superior, is yet to be determined. It apparently has many qualities to recommend it. I am not able to name the fall stripe sweet apple but it is a good tree, good bearer and good seller and has no competitor within my knowledge. The fall pippin is the only real pippin I have seen in the state except the Grimes Golden. It is apparently a good tree, good bearer, as large as the McMahan and top notch quality. Unfortunately it is not a red apple, otherwise it would apparently outclass the Wealthy.

The grape acreage in Richland county is not large but profitable and claimed by the oldest grape growers as the best grape region in the state.

A hundred cherry trees yielded \$1,040 in 1912, \$360 in 1913 and \$700 in 1914. The acreage is slowly increasing. Small fruits, when not winterkilled yield remarkable crops. Four square rods of plum farmer raspberries gave the grower forty-seven dollars.

When a tree or plant is in good condition in Richland county it is the most fruitful of any region I have found in thirty-six states. It has the soil elements and does not suffer seriously from excess of rain, drouth or frost, and if our trees would live as long as they do in the eastern states or the mountains of Virginia, it would be equal if not the best fruit region in the United States.

THE COMMERCIAL FRUIT INDUSTRY IN SAUK COUNTY.

MRS. L. H. PALMER, Baraboo.

Sauk county was largely settled by people from the fruit growing sections of the eastern states, and they naturally turned to horticulture in their new environment. Having no precedent to guide them, they followed the teaching and example of their eastern fathers, and partial failure and discouragement were inevitable. Experience is a ready teacher and our grandfathers soon learned that they must grow their own trees, as the eastern stock would not stand our somewhat drier climate where the snowfall is comparatively light.

We can make but brief mention of a few of those hardy old horticulturists in this paper, but the first to start in the nursery business was Wm. H. Canfield, who in 1843 set an orchard of two hundred trees, planted a barrel of peach pits and a bushel of apple seeds and many kinds of shrubs.

A number of severe winters culled out the tender varieties of fruit, leaving such well-known, hardy kinds as Talman Sweet, Fameuse, Golden Russet, and Seek-no-Further apples, and the Early Richmond cherry. These were largely propagated and sold through the county, and many of these trees are still alive and producing abundantly.

In 1848, James M. Clark started a nursery and orchard and about this same time M. C. Wait, Geo. Holah, Sr., of Baraboo, Stone, Perkins, and Payne of Sauk, set orchards and did a thriving nursery business.

Later, Chas. Hirschinger and A. G. Tuttle built up extensive nurseries and set large orchards. Mr. Tuttle, in 1868, obtained through the influence of our minister to St. Petersburg, Cassius M. Clay, a large part of an importation of Russian Cions. He immediately began propagating them and from his nursery we have obtained many of our best and most profitable varieties of apples. From these small beginnings the nursery business has grown to large proportions. Trees, berry plants and flowers being shipped to all parts of the United States. One firm alone handling 100,000 trees, 600,000 strawberry plants and 35,000 bush and vine plants. Many other nurseries doing a correspondingly large business.

Grapes early claimed the attention of fruit growers and have well repaid their efforts. The well-known Mount Airy vineyard started many years ago by Wm. Fox, has annually yielded many tons of fine fruit, and the famous Devil's Lake vineyard, which was conducted for many years by its founder, N. C. Kirk, is still doing business.

Among the pioneer orchardists we must mention Wm. Cady, Parley Foster, Geo. Pelton, Mr. Timlin, and D. E. Palmer, who began setting trees in 1855. These orchards have taken first place from the beginning and have yielded large returns, the Palmer orchard shipping from twelve to fourteen carloads annually for a number of years. There has been a steady growth in the fruit industry from the beginning and orchards are nearly as plentiful as cornfields, ranging in size from five to forty acres and wherever they are at all well cared for are yielding handsome returns.

Our soil and climatic conditions are so favorable that we have very little trouble from canker or fire blight, we have had very few crop failures from winterkilling or late spring frosts in fifty years.

Beginning with the Centennial Exposition at Philadelphia, in 1876, Sauk county has made large fruit exhibits at New Orleans, Chicago, and St. Louis. At Chicago we were granted special space for a county display, besides having space in the state's exhibit.

The fine display of fruit, together with the large number of premiums won, put Sauk county on the map as a prize fruit district, and from that time, Sauk county apples have found ready market from the tobacco and corn belt of the south, to the wheat fields of the north and west.

Sauk county has also taken the sweepstakes at the Wisconsin State Fair fully three-fourths of the time for the past twenty-five years.

Small fruit does not receive the attention that it should, though why is one of the horticultural mysteries, for wherever tried the results have been very satisfactory, strawberries yielding returns of from \$500.00 to \$600.00 dollars per acre, blackberries from \$500.00 to \$700.00 dollars, and all other varieties yielding equally satisfactory returns. Plums and cherries yield abundantly of fine fruit and the trees are healthy, being comparatively free from the pests that usually infest these fruits.

We have the best of transportation facilities as the C. & N. W. railroad runs a direct line through the fruit belt, giving easy and rapid connection with the great distributing points, Chicago at the south, and St. Paul and Minneapolis at the north.

The fruit growers have no elaborate coöperative system but in order to facilitate marketing, reduce freight rates and aid the small orchardist to handle his fruit, they buy barrels by the carload and all ship together. Each man packs his own fruit, marking the barrel with his own stamp. The fruit goes onto the market and is sold on its merits unless they have a special market. In any case the man stands behind his fruit and receives payment according to the quality of his goods.

The business of selling fruit direct to the consumer is receiving considerable attention, and results have been so satisfactory that

we believe a large part of our fancy fruit will be handled in that manner in the near future.

Statistics for 1913 show that there were 2,000 acres of cultivated orchard in Sauk county and that there were shipped out of Sauk county one hundred and seventy-four carloads of apples and nearly as many more individual shipments by local freight. These shipments are duplicated nearly every season.

The list of varieties adapted to our soil and altitude is too long to be given in full. We will mention only a few of the best for commercial purposes, among which are Transparent, Lowland Raspberry, Duchess, Wealthy, McMahan, Annisim, Plumb Cider, Utter, Wolf River, Fameuse, McIntosh, Malinda, N. W. Greening, Golden Russett, Windsor, Salome, and Talman Sweet.

The future possibilities are even greater than present achievements. There are many hundreds of acres of the very best of our fruit land, much of it as yet virgin soil, waiting for hustling young horticulturists possessing the speculative energy of the times, to transform into a veritable "Garden of Eden."

REPORT OF SECRETARY.

(From Reporter's Transcript.)

As your secretary, I feel that the State Horticultural Society during the past year has fulfilled the requirements laid down in its charter, namely, "The advancement of the art and science of horticulture throughout the state." We have done that, or, at least, we have aimed to do that in various ways, through conventions, through fruit shows, through the maintaining of trial orchards, through the annual report, through our magazine, through correspondence, through pamphlets and through newspapers.

Dealing with these in particular, we may say that our conventions are of great value, and that the best results of these conventions are not alone from the business transactions necessary to the conduct of our Society, not alone from the papers and discussions which are presented,—although those are of great value and form the substance of our annual reports, but through the meeting face to face of the men and women of the state who are doing things in horticulture. This personal contact and the inspiration derived from it seems to me of vastly more importance than the other things.

As to our fruit shows, one is held at each of our conventions, and I need not speak of those, we all realize their value. We also have a fruit show at the State Fair and there has been a doubt in my mind at times as to whether it was worth all that it cost, and yet, after the fair, when we meet people here and there in our state, and sometimes far outside of the state who speak of

the showing of fruits at the State Fair, I feel that it is time and money well spent. The fourth fruit show held during the year by the State Horticultural Society was at the annual convention of the International Apple Shippers' Association, and I want to call your particular attention to that, because this is an association not well-known to the members of this Society. Up to the present time in disposing of our fruit, we have done so, either independently or through organized associations, selling associations, and our fruit has consisted mostly of small fruits and cherries. We now have thousands of acres of apples planted in Wisconsin. When those apples come into bearing, you will come into direct contact with the members of the International Apple Shippers' Association, which body controls the apple situation in the United States. I do not mean that it is a trust, but when all of our thousands of acres come into bearing, even with our co-operative associations, which may then exist, you will find that the outlet for these apples will be through the members of this Association, who are the actual buyers of apples of the United States, and I submit that to place before that body fruit grown in Wisconsin is as good a thing as we can do. After having attended three of their meetings with an exhibit, I am quite convinced of that proposition. "Were these apples grown in Wisconsin?" We were asked that question and a lot of others of the same kind by people who seemed to think that Wisconsin was up somewhere just below the north pole, but we showed them many apples grown in all sections of the state. These little bronze medals that we received we regard as amongst the best trophies that we have, because we went in, in competition with New York, Michigan and all of the New England States at the annual exhibition of the International Apple Shippers' Association. We also won a fine sheaf of ribbon prizes.

We also aim to advance the science of horticulture throughout the state, through our trial orchards. While the trial orchards will be reported upon by the Trial Orchard Committee, I cannot refrain from calling attention to three of these orchards, one at Wausau, one at Poplar and one at Gays Mills. I contend that the conditions for raising fruit in the vicinity of Wausau are not favorable, and yet in spite of that we have been able to produce splendid crops and put the orchard on a paying basis. The orchard at Poplar is on heavy clay loam entirely unsuited to growing apples commercially. We have demonstrated that fact and by doing it we have saved the people of Wisconsin vast sums of money. Our orchard at Gays Mills, a little orchard of five acres, has led directly to the development of over fifteen hundred acres of apple orchards in that locality and more yet to come.

Our magazine, "Wisconsin Horticulture," while originally a child of my own, has been accepted and adopted by the Society

as a whole. It, I am constrained to believe, serves in some considerable measure in advancing horticulture in Wisconsin.

There are other ways in which we may be advancing the art and science of horticulture which are not so well known. One is through correspondence, through the office of the secretary. We try to make that office a clearing house of information to all of the people of the state, regardless of whether they are members of this Society or not, and to that end we answer annually over two thousand inquiries regarding horticulture. December 11th, last week, taking that as an average day, we answered inquiries regarding commercial fertilizers for strawberries; we answered a letter as to storing canna bulbs; we answered a citizen of Wisconsin who wanted to know about the Gays Mills fruit district. Another member wanted to know as to the reliability of the Blank Nursery company of Wisconsin. He got his answer. Then came a man from Iowa, who said he had bought some land in Polk county, Wisconsin, and he wanted to know what kind of fruit grows in that county. And so it went. And that kind of thing keeps up from January 1st to December 31st, every year.

Another way which perhaps is not as familiar to you as some of the other proceedings of the Society for advancing the art and science of horticulture, is through our secondary publications. We no longer publish the bulletins, but we do publish Press Bulletins. Through Mr. Packer's Department of the Board of Immigration and this Society, we have distributed one hundred and thirty-five thousand copies of this circular, which purports to tell the "Truth About Fruit Growing in Wisconsin," which are sent not to you, but to others, who doubt whether fruit is grown in Wisconsin. We pay for these out of our printing fund and we will probably distribute through the United States at least a hundred thousand copies more within the next year or two.

We also distribute a little folder of which unnumbered thousands are sent out, telling about Wisconsin and the State Horticultural Society.

Another way in which we aim to disseminate information, and one of the very best ways we have, is through the press of the state, and the thanks of this Society are due every minute of every day to the newspapers of Wisconsin, particularly to the country weeklies. You may be surprised to learn that there are over six hundred of those papers in Wisconsin, and we send a letter to each one of those papers, giving some information along the line of horticulture, and incidentally a little advertisement of the fact that the organization known as the State Horticultural Society exists, of which anyone may become a member on payment of fifty cents, and those country newspapers print those letters and they go out amongst their readers who are hungry for horticultural information.

The membership of the Society now consists of 1,277 annual members, and 232 life members, making a total of 1,509.

During the last year the Cranberry Growers' Association has affiliated with the State Horticultural Society, and its members are now members of our Society. We are all working along similar lines. We have in Wisconsin four or five associations, not directly connected with our Society, and yet their concern is our concern.

We have in these ways and by these means aimed to justify our existence as a Society. If we cannot do something, we would better surrender our charter, but I feel that we have done a splendid work in the state. But we must not stop, we must continue. The work is very well begun, we have set our hands to this task and we must go on in the way we have begun.

In aiming to develop the commercial resources of the state, we must not forget the home. We can do much in using our influence toward the improvement of the home grounds of the state so that every home may have a garden and an orchard and beautiful surroundings. But I would call your attention to this fact, that in this work the individual member can do more than the Society as a whole. If you will turn to your neighbor who is not a member of this Society and say, "I will help you, I will give you flowering plants or help you build up your orchard or your garden; because I am a member of the State Horticultural Society, an organization that is working toward that end," you as individuals can do a thousand times more toward the development of these improvements to the home than can the Society as a body.

I believe it is now a fact accepted by everyone, that the development of commercial horticulture, the development of the thousands of acres of apple orchards in the State of Wisconsin during the past decade,—all of this is due almost wholly to the efforts of this Society, and yet there are found some who have been afraid that we have been going too fast and too far. I do not and cannot believe that we have more than just begun. As has been suggested here, we are within reach of at least twenty-five millions of people who are buying our apples. We could well develop an acreage which shall be one hundred times as great, both in apples and in berries, without any fear of over-production, if we will work for quality of fruit rather than for quantity. It is time now that this state should use its best efforts toward establishing a name and fame for Wisconsin fruit. We want Wisconsin fruit,—with all due deference to our neighbor across the lake, to have a high standing, and we want as high repute as fruit growers as our Michigan neighbors have had. Let us see that our name is good and keep it good. Let us raise fall apples. All who have preached the raising of fall apples are congratulating themselves this year. When we can sell our fall apples for \$3.00 a barrel and winter apples are now selling at \$1.50, we feel that

our business is to keep right along in the game of raising fall apples.

We must also use our best efforts to discourage the raising of fruit for the market as a side line to farming. Let us eliminate the farm orchard, let us dig out every farm orchard in the State of Wisconsin beyond two dozen trees or so, which every man who is a good citizen should have to provide his family with all the fruit that they require.

We can and we will place Wisconsin on the map as a fruit state, and this can be done if we have faith and confidence that it can be done; if we continue the faith and confidence that we have had in the past; if we will exercise the same public spirit and unselfishness that we have in the past and if we will extend the spirit of service—without any reflection upon any of our sister societies, I challenge anyone of them to bring a record that shows the unselfish work that this society shows.

In closing, I trust you will pardon me a personal allusion. This is my eleventh annual report. In that time I have seen the Society grow from a scant one hundred members to sixteen hundred. I have seen the orchards of Wisconsin grow from a scant one thousand acres to twenty-five thousand acres. I have seen a new horticulture in Wisconsin and I have been glad to have been a part of this renaissance of horticulture in this state. There have been those who have been kind enough to say that the Secretary has done this or that or the other. I answer you, No, a thousand times No, he has not done it. It is the members of this Society that have done it and the officers of the Society that have done that work, who have held up the hands of the Secretary when he has been tempted to be discouraged. I have been merely an instrument through which you have worked. It is not a one-man Society, gentlemen, and to you as members of the Society, and to the officers of this Society who have given me that help, I extend my most sincere and grateful thanks.

REPORT OF TRIAL ORCHARD COMMITTEE.

N. A. RASMUSSEN, Chairman.

At Manitowoc, trees had made a good growth; there was some blight and foliage injury here but trees were in fairly good condition. Many of these trees are headed too high and badly crotched, many of which had split. Still the orchard shows that apples can be profitably grown at Manitowoc. The cherry orchard has been abandoned entirely as a complete failure, showing that cherries cannot be grown on the light sand in that section.

At Gays Mills the trees showed the same fine growth and vigor as in the past, with some very fine fruit. All varieties are doing

well except the McMahan; these had blighted considerably but all blighted portions had been removed. This work will be watched with interest by many, as blight and its control is a very serious problem just at present. Grapes were also in excellent condition here. This orchard proves that commercial fruit growing can be successfully and profitably carried on in the Kickapoo region.

The Medford orchard has been abandoned.

At Whitehall the apple trees on the top of the hill had not made as good growth as those on the hillside; this I think is due to the richer soil on the slope or rather the trees on the slope are getting the benefit of the fertilizer placed on the higher land. Here we found some blight and also some foliage injury; showing that spraying had not been as thoroughly done as might have been. This is probably due to the fact that the man in charge is a practical farmer, not an orchardist. This again reminds us that it is "the man behind the tree."

At Lake Geneva the cherry trees, Early Richmond and Montmorency, were in good condition, showing fine foliage and plenty of fruit-buds. The trees showed good care and promise of a large crop for next year. The apple trees, however, are in a somewhat different condition. They have the wrong habit; one straight shoot from the terminal bud and no side shoots whatever but plenty of upright. The Talman Sweet, which proved to be Price's Sweet, have blighted badly, and have spread the blight, I think, to other nearby trees. About half these trees were removed last spring and were replaced by other varieties and I think the remaining portion will follow the others in 1915. We found no apples whatever on the Duchess trees but Brother Hayes found one lone specimen on a should be Wealthy tree but as that showed no symptoms of any relationship to that breed there must be some error in the pedigree. Something must be done to bring these trees into bearing. One member said, "They are starved, feed them and we'll get some fruit," another suggested, "Sow clover, check the growth, that would be my remedy," and the third agreed to compromise. He said, "Treat half to a good coat of barnyard manure, sow the balance to clover and see if we can get some fruit and what kind."

At Wausau this year the crop was light but the orchard has done its duty; it has proven to the people of Marathon county that fruit can be profitably grown for home use and for the local market. It has also proven something of more importance. I think the orchard originally contained 138 varieties of apple trees, besides cherries and plums. When the time came to sell the crop the buyers placed the value on only a few varieties, such as Wealthy, Duchess and McMahan and perhaps one or two others. They said the balance would not more than pay for the picking. The crop would always have commanded a better price had there

been only a few standard varieties—a good lesson for all Wisconsin as well as for Marathon county.

At Poplar the orchard is still improving, showing that if this heavy clay soil is well drained, spraying, cultivating and pruning is properly done, such varieties as Duchess, Wealthy and Hibernial will give fairly good results in that section. Native plums in this orchard make good growth, produce some good crops of fruit but often get caught by frost before ripening.

The Maple orchard, though only a few miles away, is not doing quite so well. We will not blame the man in charge for this as the soil is not so well adapted to orcharding.

The vineyard at Sparta seems to be going astray, growing wood rather than fruit. New methods will be tried here to see if conditions cannot be altered.

The new orchards at Baraboo, Pewaukee and Holcombe are doing well. These have been planted to standard varieties of trees and all modern methods of pruning and cultivating will be followed in these orchards in hope that in future years they will be the finest in the land.

REPORT OF L. H. PALMER, DELEGATE TO THE IOWA STATE HORTICULTURAL SOCIETY.

Your delegate to the Iowa Horticultural Convention found the Convention being held at its permanent headquarters, at the state capitol building.

The first thing that met my gaze as I entered the corridors of the fine capitol building was apples, and on looking them over found the finest display I ever saw, being equal to the state fair exhibit at Milwaukee in 1913.

There were at least three hundred bushels of apples in boxes and plates and every apple perfect. They were so artistically arranged as to make every one stop and take notice. One exhibit contained apples from two trees of different varieties, one being a Delicious, that have for three successive years borne two crops. The first crop setting at the ordinary time, the second in July, both crops maturing, but second being undersized.

The papers were good and to the point, the subjects of spraying and marketing bringing out a lively discussion. The benefits of spraying were fully demonstrated in an orchard that was partly sprayed, the sprayed half producing 70 per cent of No. 1 fruit and the fruit from the unsprayed section being worthless.

The subject of cross breeding, led by Mr. Patten, showed great possibilities for the improvement in fruit and nut bearing trees.

The Board of Directors consists of twelve men, six being elected each alternate year. They are each required to report on the

fruit conditions of their section for the past year. All reported a failure of the fruit crop except in a few well cared for orchards; still the fine display of fruit and nuts.

The Students' Contest, held for the first time this year, was one of the attractions, showing that the boys from Ames College are very much alive to the horticultural interests of Iowa. The Interstate Apple Identification Contest, between teams from Kansas, Nebraska, and Iowa, created great interest and resulted in Nebraska winning the silver cup. The Horticultural Society of Iowa holds four district meetings and one state meeting, all working harmoniously together for better fruit for Iowa. The banquet held Wednesday evening was not only well attended, but very enjoyable as the speakers were very entertaining, story telling being entirely omitted.

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